

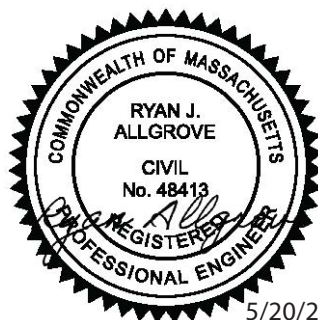
Lower Central Interceptor Improvements



Contract Documents

PREPARED FOR:

Town of Weymouth
75 Middle Street
Weymouth, Massachusetts 02189



5/20/25



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DIVISION 0

BIDDING AND CONTRACT REQUIREMENTS

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SECTION 00020

INVITATION TO BID

1. The **Weymouth Department of Public Works, Weymouth, Massachusetts**, the awarding authority, invites sealed Bids for the **Lower Central Interceptor Improvements** project in accordance with the documents prepared by Apex Companies, LLC.
2. General Bids will be received until **2 p.m.** prevailing time on **June 17, 2025**. All bids shall be submitted online at www.Projectdog.com and entitled **“Lower Central Interceptor Improvements”** All electronic bids are compiled in real time upon bid close and published forthwith on ProjectDog. Official bid tabulations shall be posted on ProjectDog.
3. The Work under this Contract includes, but is not necessarily limited to furnishing all materials, labor and equipment for abandonment of existing 30” reinforced concrete sewer and installation of approximately 1,040 LF of new 42” PVC sewer via open trench, 275 LF of new 8” PVC sewer via open trench, 135 LF of 60” steel casing pipe and 42” diameter PVC carrier pipe via pipe jacking, and appurtenances in a municipal sewer easement.
4. A non-mandatory pre-bid meeting will be held on May 29, 2025 at 10:00 a.m. at the project site, which can be accessed via Edison St., Weymouth, MA 02188. No vehicles shall be parked on Edison St. **All bidders are strongly encouraged to attend.**
5. All bids shall be submitted electronically online at www.Projectdog.com no later than the date and time specified above. **Hard copy bids will not be accepted by the Weymouth Department of Public Works.**
6. This project is being Electronically Bid (E-Bid). All bids shall be submitted online at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Tutorials, instructions, and videos on how to complete the electronic bid documents are available online as well as in Section 00100 - Instructions to Bidders and Supplemental Instructions to Bidders for Electronic Bid Projects. For assistance, contact Projectdog, Inc. at (978) 499-9014.
7. Bid forms and contract documents are available online at www.Projectdog.com. Enter Project Code **868753** in the project locator box and select “Acquire Documents” to download documents or to purchase hard copies. New users to Projectdog.com must first select Sign Up to create an online account. Contract documents may also be viewed, but not removed, from the offices of Projectdog, Inc., 18 Graf Road - Unit 8, Newburyport, MA 01950, Monday – Friday, 8:30 a.m. to 5:00 p.m.
8. Any and all addenda shall be posted online at Projectdog.com. Each individual or firm recorded as having received the contract documents will be notified by email if and when addenda are issued. Hard copies of addenda will not be mailed or faxed to plan holders. It is the sole responsibility of the Bidder to review any and all addenda prior to the bid opening either online or at the offices of Projectdog, Inc.
9. All documents shall be submitted in PDF format only. All bidders must complete and digitally sign (Adobe) or print, complete, sign and scan bid form Signature page(s) and upload as a PDF file.

10. All construction activities must be completed **365 calendar days** from and including issuance of a notice to proceed. In accordance with the project's Order of Conditions issued by the Town of Weymouth Conservation Commission, the performance of certain construction activities is not allowed within the period between March 1st to June 30th.
11. A portion of the work is within the MBTA Zone of Influence (ZOI) and Right of Way (ROW). All work within the ZOI and ROW must be completed in accordance with the MBTA License Agreement. It is anticipated that the License Agreement will be issued for execution by the Contractor by July 2025. No work within the MBTA ZOI can be started prior to execution of the license agreement including all requirements therein.
12. Contract payment will be by the unit price method and the lump sum price method as indicated on the Bid Proposal. No Bidder may withdraw their Bid for a period of thirty (30) calendar days after the actual date of the opening of the Bids.
13. Bidders shall certify that they do not, and will not, maintain or provide for their employees any facility that is segregated on a basis of race, color, creed, sex, national origin, or sexual preference.
14. The bidding and award of the Contract shall be in full compliance with Sections 44A to 44J inclusive of Chapter 149 of the General Laws of the Commonwealth of Massachusetts as last revised.
15. This project shall also comply with Sections 39F, 39K, 39N, and 39O of Chapter 30 of the General Laws of the Commonwealth of Massachusetts as last revised and included in Appendix C.
16. Each bid shall also be accompanied by a bid security in the form of a certified, treasurer's or cashier's check, bid bond or cash in the amount of 5 percent of the value of the Bid. Bid Security Deposit shall be at least five percent (5%) of the greatest possible bid amount, considering all alternates. Bid Bonds issued by a surety company must be uploaded with the other required forms. Bidders providing bid bonds in the form of cash or check must complete and upload the [Bid Bond Affidavit Form](#).
17. Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) policies of the Town of Weymouth are *applicable to the total dollars paid to this contract*. The **"Fair Share"** goals for this project are a minimum of: **10.0% MBE Participation (Weymouth goal)**; and, **5.0% WBE Participation (Weymouth goal)** by state-certified (SOMWBA) MBEs and WBEs. To comply with the requirements of this program, the Bidder must submit the appropriate MBE/WBE forms with the Bid as described and included in Appendix F and (Schedule of Participation, Letter of Intent, Vendor Information Form). Failure to comply with the requirements of this program may be deemed to render a proposal non-responsive. No waiver of any provision of this section will be granted unless approved by the Town of Weymouth
18. Minimum wage rates as determined by the Commissioner of Department of Workforce Development under the provision of the Massachusetts General Laws, Chapter 149, Sections

26 to 27G, as amended apply to this project, as contained in Appendix B of the Contract Documents. It is the responsibility of the contractor, before bid opening, to request, if necessary, any additional information on the Minimum Wage Rates for those trade people who may be employed for the proposed work under this contract.

19. The successful Bidder must furnish 100 percent (100%) Construction Performance Bond and 100 percent (100%) Construction Payment Bond.
20. Complete instructions for filing Bids are included in the Instructions to Bidders, Section 00100.
21. The Owner reserves the right to waive any informality in or to reject any or all Bids if deemed to be the best interest of the Owner.
22. The Owner reserves the right to omit part or whole of any proposed work to be performed, as described in the Contract Documents, as may be required to maintain the total cost of work within available funds.

**DIRECTOR OF PUBLIC WORKS
WEYMOUTH, MASSACHUSETTS**

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SECTION 00100

INSTRUCTIONS TO BIDDERS

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1. Receipt and Opening of Bids
2. Preparation of Bid
3. Examination of Contract Documents and Site
4. Qualifications of Bidders
5. Method of Award
6. Bid Security
7. Liquidated Damages for Failure to Enter into Contract
8. Time of Completion and Liquidated Damages
9. Conditions of Work
10. Addenda and Interpretations
11. Security for Faithful Performance
12. Power of Attorney
13. Notice of Special Conditions
14. Laws and Regulations
15. Competitive Bidding
16. Subsurface Investigation
17. Wage Rates
18. MBE/WBE Enterprise Program Requirements
19. Manufacturer's Experience
20. Equal Products Acceptable
21. Sales Tax Exemption
22. Guarantee
23. Bonding and Insurance
24. Health and Safety Regulations
25. Third Party Work

1. Receipt and Opening of Bids:

The Weymouth Department of Public Works (herein called the "Owner") invites bids on the form attached hereto, all blanks of which must be appropriately filled in. All filed sub-bids and general bids shall be submitted electronically online at www.Projectdog.com no later than the date and time specified. No hard copy bids will be accepted. All electronic bids are compiled in real time upon bid close and published forthwith on ProjectDog. Official bid tabulations shall be posted on ProjectDog. The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered.

No Sub-Bidder or Bidder may withdraw a bid within thirty (30) calendar days after the actual date of the opening thereof.

2. Preparation of Bid:

Bids shall be submitted electronically at www.Projectdog.com as appropriate and at no cost. There are PDF and video tutorials available online. For additional assistance call Projectdog, Inc 978-499-9014.

All bidders must complete and digitally sign (Adobe) or print, complete, sign and scan bid form Signature page(s) and upload as a PDF file.

All documents must be in PDF format only.

Sums shall be expressed in both words and figures in the space indicated on the bid form. Where there is a discrepancy between the bid sum expressed in words and the bid sum expressed in figures, the words shall control. Note: The online form will automatically match the word value to the numeric figure entered in whole dollar amounts with no punctuation.

Each bid must be submitted on the prescribed form. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures. Each bid must be submitted electronically online at www.Projectdog.com no later than the date and time specified bearing the name of the Bidder, his address, the name of the project for which the bid is submitted, and containing the bid security as specified in paragraph 5 below.

Enclosed with the bid shall be the following completed items:

- Bid Security (5%)
- Completed Bid Proposal (Section 00300, including references)
- Completed Certificate of Non-Collusion (Section 00480)
- Completed Certificate of Corporate Vote (Section 00481)
- Completed Certificate as to Payment of State Taxes (Section 00482)
- Completed Certificate as to OSHA 10 Hour Training (Section 00483)
- Completed State Debarment Disclosure Form (Section 00484)
- Completed Indemnity Agreement (Section 00520)
- All applicable MBE and WBE forms (Appendix F)

If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid form.

3. Examination of Contract Documents and Site:

Before submitting a Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the Work, (c) familiarize himself with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work; and (d) study and carefully correlate Bidder's observations with the requirements of the Contract Documents.

Before submitting his/her Bid each Bidder may, at his/her own expense, make such additional investigations and tests as the Bidder may deem necessary to determine his/her Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

On request made to the Engineer, each Bidder shall be provided access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his/her Bid. **A pre-bid meeting and site visit are scheduled as indicated in the Invitation to Bid (Section 00020).** All bidders are strongly encouraged to attend.

The lands upon which the Work is to be performed, rights-of-way for access thereto and other lands designated for use by CONTRACTOR in performing the Work are identified in the Supplementary Conditions, General Requirements or on the Drawings. The submission of a Bid will constitute an incontrovertible representation by the Bidder that he/she has complied with every requirement of this Article and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

4. Qualifications of Bidders:

The Owner may make such investigations as he deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. At a minimum, the bidder must include information from at least 3 similar projects completed during the past 5 years. Project information forms are provided in Section 00300. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

5. Method of Award:

If at the time this contract is to be awarded, the lowest bid submitted by a responsible Bidder does not exceed the amount of funds then estimated by the Owner as available to finance the contract, the contract may be awarded on the basis of such bid. If such bid exceeds such amount, the Owner may reject all bids or take other action deemed to be in the best interest of the Town of Weymouth, Massachusetts.

6. Bid Security:

Each bid must be accompanied by a bid bond or cash, or a certified check on, or a treasurer's or cashier's check issued by a responsible bank or trust company, in the amount of not less than 5 percent of the bid price, payable to the Town of Weymouth, Massachusetts. The properly executed bid security shall be placed in a sealed envelope and be submitted with the bid at the time of the submission of the bid. Bid securities will be returned to all except the three lowest Bidders within five days, Saturdays, Sundays, and legal holidays excluded after the opening of bids, and the remaining checks of the Bidders will be returned promptly after the Owner and the accepted Bidder have executed the contract, or if all bids are rejected.

7. Liquidated Damages for Failure to Enter into Contract:

The successful Bidder, upon his failure or refusal to execute and deliver the contract and bonds required within ten days after he has received notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid, provided that the amount of the security which becomes the property of the Owner shall not, in any

event, exceed the difference between his bid price and the bid price of the next lowest responsible Bidder.

8. Time of Completion and Liquidated Damages:

Time is of the essence. Construction must be substantially complete **270 calendar days** from and including issuance of a notice to proceed. All construction activities must be completed **365 calendar days** from and including issuance of a notice to proceed. Construction of SMH 5D and handling of flow from Savannah Drive must be complete by **December 1, 2025**. Bidders must agree also to pay as liquidated damages the sum of **\$1,500.00** for each consecutive calendar day thereafter that the Bidder is in default of completing the work as hereinafter provided in the General Conditions.

9. Conditions of Work:

Each Bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful Bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract. Insofar as possible, the Contractor in carrying out his work must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor.

10. Addenda and Interpretations:

No interpretation of the meaning of the Drawings, Specifications or other pre-bid documents will be made to any Bidder orally.

Each individual or firm recorded as having requested a set of Contract Documents will be electronically notified via email when addenda are issued. Hard copy addenda will not be issued. It is the Bidder's responsibility to view the information online.

Copies of addenda will be made available for inspection at the locations listed in the Advertisement where Contract Documents are on file and/or available at www.Projectdog.com on the projects download page.

11. Security for Faithful Performance:

Simultaneously with his delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner and shall be in the full amount of the accepted proposal.

12. Power of Attorney:

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

13. Notice of Special Conditions:

Attention is particularly called to those parts of the Contract Documents which deal with the following:

- a. Time of Completion
- b. Inspection and testing of materials
- c. Insurance requirements
- d. Coordination of the work
- e. Subsurface Investigation (Appendix A)
- f. MBE/WBE requirements (Appendix F)
- g. Prevailing Wage Rates (Appendix B)
- h. Weymouth Conservation Commission Order of Conditions (Appendix D)
- i. Wetland Delineation Report (Appendix E)
- j. 401 Water Quality Certification (Appendix G)
- k. MBTA License Requirements

14. Laws and Regulations:

Applicable provisions of the Massachusetts General Laws and Regulations and/or the United States Code of Federal Regulations govern this Contract and any provision violation of the foregoing shall be deemed null, void, and of no effect. Where conflict between Code of Federal Regulations and State Laws and Regulations exist, the more stringent requirement shall apply.

15. Competitive Bidding:

The bidding and award of the Contract shall be in full compliance with Chapter 30, Section 39M inclusive of the General Laws of the Commonwealth of Massachusetts as last revised. Bids from General Contractors shall be for the complete project as specified.

16. Subsurface Investigation:

Subsurface investigations have been made in the approximate locations indicated on the Drawings. Refer to the geotechnical report and boring logs provided in Appendix A for additional information.

17. Wage Rates:

Minimum Wage Rates as determined by the Commissioner of Department of Labor and Industries under the provision of the Massachusetts General Laws, Chapter 149, Sections 26 to 27D, as amended, apply to this project. The Wage Determination is attached to these Specifications. It is the responsibility of the Contractor, before bid opening, to request, if necessary, any additional information on wage rates for those trades people who are not covered by the applicable Wage Decision, but who may be employed for the proposed work under this contract. See Appendix C for a listing of State Wage Rates for this project.

18. MBE/WBE Enterprise Program Requirements:

Bidders shall comply with all of the requirements of the Town of Weymouth Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) Program provided in Appendix F. All bidders must complete the applicable forms included in Appendix F.

Contracts for work under this bid will obligate the Contractors and Subcontractors not to discriminate in employment practices and to comply with all the requirements of the Town of Weymouth Minority MBE/WBE Program.

Requirements of the Weymouth MBE/WBE program include a target MBE participation goal of 10% and a target WBE participation goal of 5%.

All MBEs and WBEs must be certified by the State Office of Minority and Women Business Assistance (SOMWBA).

19. Manufacturer's Experience:

Wherever it may be written that an equipment manufacturer must have a specified period of experience with his product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified period, which will guarantee replacement of that equipment in the event of failure.

20. Equal Products Acceptable:

Wherever in the Drawings and Specifications any item of equipment or material is designated by reference to a particular brand, manufacturer, or trade name, it is understood that an approved equal product, acceptable to the Engineer, may be substituted by the Bidder or Contractor. With a few exceptions, whenever a material, article, or piece of equipment is identified by reference to a manufacturer or trade name, it shall be understood that this is referenced for defining the performance of the material, article, or piece of equipment, and that other products of equal capacities, quality, and function shall be considered. It shall be the Contractor's responsibility to coordinate all submittals to eliminate any conflicts which might arise due to the use of the "or equal" item. Any additional costs incident to the use of "or equal" items, including re-design, will be paid by the Contractor.

21. Sales Tax Exemption:

The Owner is exempt from the Massachusetts sales tax and the Contractor shall not include any amount for said tax in his bids. The sales tax exemption number for the Town of Weymouth is **E-046001274**.

22. Guarantee:

The Contractor shall at a minimum guarantee, unless specified otherwise, that the work under this contract and the materials furnished by him for use in connection therewith to be free from defects or flaws for one (1) year after the completion of the Contract, and acceptance of the facility by the

Owner and guarantees for a term of one (1) year from the date of final completion of the work to maintain the stability of all materials, equipment, or workmanship, except that due to normal wear and tear, at his own expense, when notified, in writing, to do so by the Engineer, and such work shall be performed to the satisfaction of the Engineer.

If, at any time within said guaranty period, any part of the work constructed under the terms of this contract shall, in the opinion of the Engineer, require repair or replacement due to defective work or materials furnished by the Contractor, he may notify the Contractor, in writing, to make the required work and repairs, and the Contractor shall perform the same promptly. If he shall not do so, the Owner may do it and charge the Contractor.

It is expressly understood, however, that these guarantee provisions shall not absolve the Contractor from any liability to the Owner arising out of a failure to substantially complete the work in accordance with the Drawings and Specifications.

23. Bonding and Insurance:

The Contractor must furnish performance and payment bonds, each of which shall be in an amount not less than 100 percent of the contract price. Contractors should obtain such construction insurance (e.g., fire and extended coverage, worker's compensation, public liability and property damage, and "all risk" builders risk) as indicated in the Supplemental Conditions (Section 00800).

The Contractor must also obtain insurance meeting MBTA requirements as provided in Appendix I.

24. Health and Safety Regulations:

This project is subject to the Safety and Health Regulations of the U.S. Department of Labor set forth in Title 29 CFR, Part 1926 and to all subsequent amendments, and to the Massachusetts Department of Labor and Industries, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction Operations" (Chapter 454 CMR 10.00 et seq.). Contractors shall be familiar with the requirements of these regulations.

25. Third Party Work:

The Contractor is responsible for maintaining a safe and secure worksite at all times, and for expeditiously repairing any damage done to private property. If, in the opinion of the Owner, the Contractor is negligent in these duties the Owner shall have the right to employ a third party to remedy the problem. Situations which develop and require the services of and payment to a third party will be handled in the following manner:

- A. The Contractor will be given a reasonable period of time determined at the discretion of the Owner to remedy the situation without third party involvement. If the Contractor is unavailable the Owner will authorize work by a third party on the Contractor's behalf.
- B. Third party work authorized on the Contractor's behalf by the Owner shall be paid for by the Contractor within a reasonable time period (generally two weeks). If payment is not made within a reasonable time period the Owner will make payment and deduct the cost from the next pay requisition.

- C. In the case of inadequately secured worksites necessitating extra or increase police details or other public safety personnel, the following procedure will be followed. The Contractor (if available) will be notified that the worksite needs to be secured in order to prevent the need for weekend/night police coverage. If the area is not immediately secured as determined by the Owner or Engineer, a police, fire, or department of public works detail will be used and the Contractor will be charged for the cost. It is understood that in many instances worksites cannot realistically be secured to a point where police or other safety personnel are not needed. In these instances, the Owner will continue to pay for the coverage.

END OF SECTION 00100

Projectdog, Inc

Supplemental Instructions to Bidders for Electronic Bid Projects (E-Bid)

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Sign Up

Every user of Projectdog.com has a unique username and password for their account. **MANDATORY:** All users must keep usernames and passwords **PRIVATE** and **SECURE**. Do not share accounts.

1. Go to www.Projectdog.com.
2. Select the “Sign Up” (Fig 1).
3. Complete all required form fields and press Submit.
An automatic email will be sent to the registered email.
4. Select the confirmation link in the email to complete the registration.

Login

1. Go to www.Projectdog.com.
2. Enter a registered email address and password (Fig 1).
3. Press Login.

Logoff

1. Hover over Home (Fig 2).
2. Select “Logoff”.

Forgotten Password


1. Select “Forgot your password?” (Fig 3).
2. Enter the e-mail address.
3. Select “Send Info”. An automated e-mail will be sent with the password.

Account Information

View and edit user contact information. To change an email address, users must register a new account. Call Projectdog to have the old account removed.

1. Hover over Home (Fig 4).
2. Click “My Information”.
3. Edit information as needed.
4. Click “Save” to finalize edits.

Fig 1



Email:

Password:

[Sign Up](#) [Forgot your password?](#) [Login](#)

Customer Support 978-499-9014

Fig 2



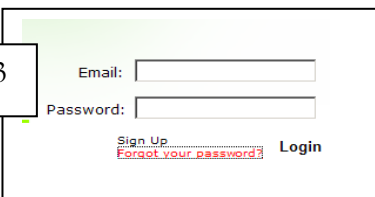
Projectdog

[Home](#) [Project Central](#) [Company](#)

[My Information](#)

[Logoff](#)

Fig 3

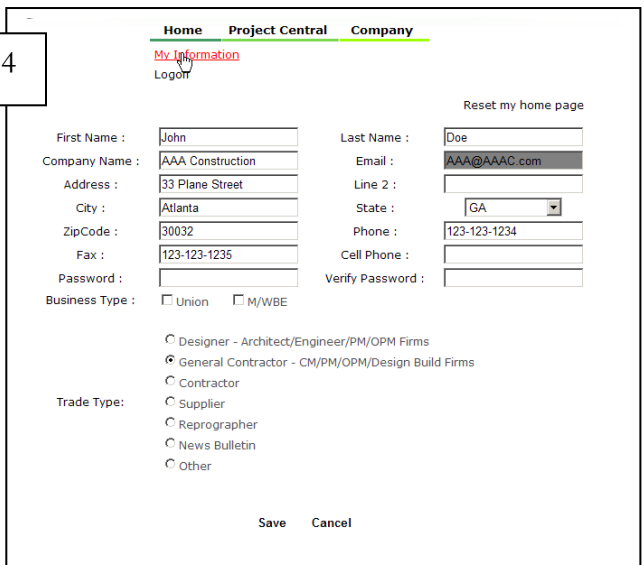


Email:

Password:

[Sign Up](#) [Forgot your password?](#) [Login](#)

Fig 4



[Home](#) [Project Central](#) [Company](#)

[My Information](#)

[Logoff](#)

Reset my home page

First Name : Last Name :

Company Name : Email :

Address : Line 2 :

City : State :

ZipCode : Phone :

Fax : Cell Phone :

Password : Verify Password :

Business Type : ☐ Union ☐ M/WBE

Trade Type :

☐ Designer - Architect/Engineer/PM/OPM Firms

☒ General Contractor - CM/PM/OPM/Design Build Firms

☐ Contractor

☐ Supplier

☐ Reprographer

☐ News Bulletin

☐ Other

[Save](#) [Cancel](#)

Project Details

Utilize the search page (Fig 5) or enter a Project Code (Fig 6) to view a project's "Project Details" page (Fig 7).

Fig 5

Search Project Calendar

Search All Projects Packs/Balance 0

Refine Search:
City: State:

Project Details Key Word:

Limit search by date.
From: 3/28/2016 To:

Amount: No Preference

Refine your search by choosing only the divisions that you are interested in!

☒ Search All Projects

☐ Division 1 ☐ Division 2 ☐ Division 3 ☐ Division 4
☐ Division 5 ☐ Division 6 ☐ Division 7 ☐ Division 8
☐ Division 9 ☐ Division 10 ☐ Division 11 ☐ Division 12
☐ Division 13 ☐ Division 14 ☐ Division 15 ☐ Division 16
☐ Division 17 ☐ General Contractor

For an explanation of which subcategories are included in each of the above divisions, click here

☐ Limit search to only projects added within the last 5 days.
☐ Limit search to only projects with documents.

Search

Fig 6

You are logged in as: sales@projectdog.com

Enter Project Code GO

Central Company

Fig 7

Project Details Add to my Project Calendar

Code: 795198
Project Title: Page Elementary School - Phase II
Location: West Newbury, MA

Timeline

Plans/ Specifications Available: 06/06/12 02:00 PM
General Bid Deadline: 06/27/12 11:00 AM
Sub Bid Deadline: 06/20/12 11:00 AM
Estimated Cost: 5.7M

Document Manager

View Orders Phone: 978-499-9014
Projectdog Fax: 978-499-9016
18 Graf Road, Suite II Email: orders@projectdog.com
Newburyport MA US, 01950

Manager

Michael Williams Phone: 617-241-2807
KBA Architects Fax: 617-241-2857
6 Thirteenth St Email: mwilliams@kbaarchitects.com
Charlestown Navy Yard
Charlestown MA US, 02129

Contract Information

Project: Additions and Renovations to the Dr. John C. Page Elementary School.
Sub Bid Divisions: 4,5,7,8,9,15,16,GC

For an explanation of which subcategories are included in each of the above divisions, click here

Additional Information:
Project Number: 5117711, Contractor Qualification: DCAM Certificate, Contact: Mike Williams, Phone: 617-241-2807, Fax: 617-241-2857, Email: hdelorey@kbaarchitects.com, Sub Bid Categories: Masonry, Misc. Metals, Roofing, Metal Windows, Glass & Glazing, Acoustical Tile, Tile, Resilient Flooring, Painting, Plumbing, HVAC, Electrical, Additional Information: Pre-bid conference: 6/13/12 at 3:00 P.M. at the Page Elementary School, 694 Main St., West Newbury.

Acquire Documents

Document Recipients

Survey

Acquire Documents

Download all project documents.

1. Click "Acquire Documents" link found on a project's "Project Details" page (Fig 7).
2. Respond to the Legal Notice after reviewing.
3. Click on any file description to open, review, or save a document (Fig 8).

Users are automatically added to the project's "Document Recipients" list to receive update notifications upon viewing any document online.

Fig 8

You may download or purchase the jobs below. For free download click on the description. To order hardcopies press the order button below.

Project# 795198 Page Elementary School - Phase II

Plans

Section	Description	Type	Size K
All Plans		PDF	54
Plans: Cover & Table of Contents		PDF	2665
Plans: Civil		PDF	3604
Plans: Demolition		PDF	1238
Plans: Architectural		PDF	15510
Plans: Structural		PDF	16185
Plans: Fire Protection		PDF	993
Plans: Plumbing		PDF	1576
Plans: Mechanical		PDF	7411
Plans: Electrical		PDF	10724

Specifications

Section	Description	Type	Size K
CD Bid Set		PDF	65
Specifications		PDF	10879

Adobe Acrobat Reader®

Order Hardcopy

Document Recipients

Review all plan holders who have acquired documents.

1. Click "Document Recipients" link found on a project's "Project Details" page (Fig 7).
2. All potential bidders are listed and sorted by company type (Fig 9). Click on a column title to sort alphabetically.

Fig 9

Project# 795198 Page Elementary School - Phase II

Company	Name	Address	City	State	Zip	Phone	Fax	Type
us System	Frank Smerczynski	34 Main Street EXT	Plymouth	MA	02360	747-7122	747-7322	Contractor
Enterprises Inc.	Joseph Steffano Jr	PO Box 536	East Boston	MA	02128	617-603-8918	617-567-2152	Contractor
Tri State Fire Protection LLC	Richard Boynes	84 Lake Street	Nashua	NH	03060	293-7531	603-2051	Contractor
Steelco Fence	Donald Monty	PO Box 520	Needham	MA	02494	781-8990	781-7182	Contractor (Division 02.)
D.P.Masonry, Inc.	Derek Pacheco	833-D American Legion Highway	Westport	MA	02790	774-264-9223	774-264-9223	Contractor (Division 04, 07.)
PCM Construction	John Powers	81 Westford Rd.	Ayer	MA	02451	978-772-7722	978-603-6032	Contractor
Fernandes Masonry, Inc.	Kate Royce	1031 Phillips Road	New Bedford	MA	02745	508-778-6929	508-778-6148	Contractor (Division 05.)
Quinn Brothers of Essex, Inc.	Stephanie Taber	239 Western Avenue	Essex	MA	01929	768-6929	768-6148	Contractor (Division 05.)
NN PAINTING	JOSE NASCIMENTO	175 McClellan Highway	E BOSTON	MA	02128	617-418-6929	617-418-6929	Contractor (Division 05.)

Electronic Bid (E-Bid)

This project is being **Electronically Bid** at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Go to www.Projectdog.com and Login with an existing account or click [Sign Up](#) to register for free. Enter a project code or search by keyword to access the “Project Details” page. Select “Acquire Documents” to download all bidding documents.

Projectdog

Enter Project Code GO

[Home](#) [Project Central](#) [Company](#)

[Add to my Project Calendar](#)

Project Details

Code: 799090
Project Title: Ebid
Location: Newburyport, MA

Timeline
Plans/ Specifications Available: 05/22/13 10:00 AM
General Bid Deadline: 06/21/13 04:00 PM
Sub Bid Deadline: 06/19/13 04:00 PM
Estimated Cost: Negotiated

Project Owner
Sales Department
Projectdog
18 Graf Road
Suite 8
Newburyport MA US, 01950
Phone: 978-499-9014
Fax: 978-499-9014
Email: sales@projectdog.com

Document Manager
Online Orders
Projectdog
18 Graf Road, Suite 8
Newburyport MA US, 01950
Phone: 978-499-9014
Fax: 978-499-9016
Email: orders@projectdog.com

Contract Information
Project:
Ebid Test Demo for Sales Department.
Additional Information:
THIS PROJECT IS BEING ELECTRONICALLY BID AND HARD COPY BIDS WILL NOT BE ACCEPTED. The bids are to be prepared and submitted at www.Projectdog.com. Tutorials and instructions on how to complete the electronic bid documents are available online along with all project documentation.

Project Documents
[Acquire Documents](#)
[Document Recipients](#)
[GC E-Bid](#)
[Sub E-Bid](#)

How to Submit an E-Bid

Complete and save all required forms as PDF files. Please be sure to sign all required signatures either digitally or manually.

1. Select the **GC E-Bid** or **Sub E-Bid** link located on the “Project Details” page.

Subcontractors select a bidding trade;

General Contractors will not be able to submit an E-Bid until the official sub bid tabulation is released by the Awarding Authority.

2. Answer / enter / upload all required areas. Enter all dollar value amounts as a whole dollar values only.
3. Select “Submit My E-Bid.” Review the submitted bid package via the “View My Bid Package” link.

It's that simple!

Bidding Trades			
Please select trade(s) you are bidding.			
Section#	Description	Status	Bidding
220000	Plumbing	Incomplete	GO
230000	HVAC	Incomplete	GO
260000	Electrical	Incomplete	GO

You will not be able to Submit your bid unless all mandatory fields are complete. Please allow yourself sufficient time to upload all information. You will receive an automated email once completed. Please save this for your records.

DHCD 016128 Roof Replacement & Vinyl Siding, Project #811541

Acknowledge Addendum 0, ☐ Yes ☐ No

Bid Price (Whole Dollar) 00

Form for General Bid (Signature page) [Add File -](#)

Bid Bond [Add File -](#)

Bidders Reference Form [Add File -](#)

Item 2 Sub-bids as follows:

There are no Sub bids for this project.

Bid Closes in:
0 Days 2 Hours 20 Minutes 20 Seconds.

[Save](#) [Submit my E-Bid](#) [Close](#)

You will not be able to Submit your bid unless all mandatory fields are complete. Please allow yourself sufficient time to upload all information. You will receive an automated email once completed. Please save this for your records.

DHCD 016128 Roof Replacement & Vinyl Siding, Project #811541

Acknowledge Addendum 0,1, ☒ Yes ☐ No 4/6/2016

Bid Price (Whole Dollar) 25000.00 twenty-five thousand Dollars.

Form for General Bid (Signature page) [View File](#)

Bid Bond [View File](#)

Bidders Reference Form [View File](#)

Item 2 Sub-bids as follows:

There are no Sub bids for this project.

Bid Closes in:
0 Days 2 Hours 11 Minutes 20 Seconds.

[Retract](#) [View My Bid Package](#) [Close](#)

<https://www.projectdog.com/UploadAssistGCEBid.aspx?Description=Form%20fc>

Form for General Bid Upload Assistant

Form for General Bid

File: No file chosen

Type: PDF ▼

Size:

Add File

Click “Add File” on the E-Bid page to open the Upload Assistant window. Then click “Browse” or “Choose File” to upload a PDF file.

You will not be able to Submit your bid unless all mandatory fields are complete. Please allow yourself sufficient time to upload all information. You will receive an automated email once completed. Please save this for your records.

DHCD 016128 Roof Replacement & Vinyl Siding, Project #811541

Warning: Your Bid is not complete.

Please complete:

- Acknowledge Addendum 0,1,
- Bid Price (Whole Dollar) Invalid, numeric values only.
- Bid Bond
- Bidders Reference Form

Please complete all mandatory areas then Submit your E-Bid.

Acknowledge Addendum 0,1, ☐ Yes ☐ No

Bid Price (Whole Dollar)

Form for General Bid (Signature page)

Bid Bond

Bidders Reference Form

Item 2 Sub-bids as follows:

There are no Sub bids for this project.

Bid Closes in:
0 Days 2 Hours 20 Minutes 20 Seconds.

Warning

E-Bids cannot be submitted unless all areas are complete.

Save before adding files or closing the window or E-Bid data may need to be re-entered.

Projectdog.com server time is set to industry standards at time-a.nist.gov. Bidders are encouraged to update their computer clock.

Bidders may save, submit or modify an Electronic Bid (E-Bid) at any time prior to bid close. Once submitted, a bid cannot be edited. To modify a bid the bidder must retract the bid, make any necessary changes, and then submit the bid again. Upon submitting or retracting the bidder will receive a convenience email for informational purposes only. Bidders are encouraged to contact Projectdog if an email is not received.

It is the bidder’s responsibility to review and confirm online that a bid has been submitted and/or retracted and that the bid is 100% true, complete and accurate. All bidders are required to review their submitted E-Bid via the “[View My Bid Package](#)” link.

If a bid is submitted prior to an addendum being issued the bidder will receive an automated email for informational purposes only stating the bidder must review the addendum, retract the bid, acknowledge all addenda, and submit the bid again. If a bidder fails to acknowledge addenda their bid may be rejected by the Awarding Authority.

Once the bid deadline has closed the E-Bid links are no longer available. All E-Bids are compiled in real time upon bid close and published forthwith on the “Project Details” page titled as “List of Bids Received”. Official bid tabulations are posted at the discretion of the Awarding Authority.

For additional assistance, call Projectdog at (978) 499-9014 (M-F, 9AM-5PM).

SECTION 00300

BID FORM

To the Town of Weymouth, Massachusetts:

Regarding: **Lower Central Interceptor Improvements Contract #PW-25-002-S**

The Undersigned Bidder declares as follows:

- The only parties interested in this BID as Principals are named herein;
- This BID is made without collusion with any other person, firm, or corporation;
- No officer, agent, or employee of the Owner is directly or indirectly interested in this BID;
- The Bidder has carefully examined the site 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 has carefully read and examined the Drawings, the annexed proposed AGREEMENT and the Specifications and other Contract Documents therein referred to and knows and understands the terms and provisions thereof;
- Understands that information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished only for his information and convenience without any warranty or guarantee, expressed or implied, that the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered will be the same as those shown on the Drawings or in any of the other Contract Documents and agrees that the Bidder shall not use or be entitled to use any such information made available to him through the Contract Documents or otherwise or obtained by him in his own examination of the site, as a basis of or ground for any claim against the Owner or the Engineer arising from or by reason of any variance which may exist between the aforesaid information made available to or acquired by him and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and has made due allowance therefore in this BID;
- and the Bidder understands that the quantities of work tabulated in this BID or indicated on the Drawings or in the Specifications or other Contract Documents are only approximate and are subject to increase or decrease as deemed necessary by the Engineer;
- and agrees that, if this BID is accepted will contract with the Owner, as provided in the copy of the Contract Documents deposited in the office of the Engineer, this BID form being part of said Contract Documents, and that the Bidder will perform all the work and furnish all the materials and equipment, and provide all labor, services, plant, machinery, apparatus, appliances, tools, supplies and all other things required by the Contract Documents in the manner and within the time therein prescribed and according to the requirements of the Engineer as therein set forth, and

that the Bidder will take in full payment therefore the lump sum or unit price applicable to each item of the Work as stated in the following schedule:

Bidders must bid on each Bid Item. All entries in the entire BID must be made clearly and in ink; prices bid must be written in both words and figures. In case of discrepancy, the amount shown in words will govern.

Bidders shall insert extended item prices obtained from quantities and unit prices. In case of discrepancy between the product obtained by multiplying the estimated quantity by the unit price, the actual product shall apply. In case of discrepancy between the sum of the total figure of the items and the total amount listed, the actual sum shall apply.

Receipt of Addenda numbered _____ to _____, inclusive, is acknowledged.

(Bidder) _____

(by) _____

(Title) _____

BASE BID

The work of the General Bidder, being all work covered by items 1 through 22, inclusive.

Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
1	Mobilization and Demobilization (Cost shall not exceed 5% of the total of bid items 2-22) _____ Dollars and _____ Cents	LS	1		
2a	Furnish and Install 8" PVC Sewer _____ Dollars and _____ Cents	LF	275		

Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
2b	Furnish and Install 42" PVC Sewer _____ Dollars and Cents	LF	1040		
2c	Bentonite Clay Dams _____ Dollars and Cents	EA	8		
3a	4' Diameter FRP Manhole _____ Dollars and Cents	EA	1		
3b	6' Diameter FRP Manhole _____ Dollars and Cents	EA	11		
3c	4' Diameter Doghouse Concrete Manhole _____ Dollars and Cents	EA	1		
3d	5' Diameter Doghouse Concrete Manhole _____ Dollars and Cents	EA	1		
3e	4' Diameter Concrete Manhole _____ Dollars and Cents	EA	4		

Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
4	Connection to Existing Sewer Service _____ Dollars and Cents	EA	1		
5	Rock Excavation _____ Dollars and Cents	CY	1,350		
6	Exploratory Excavations _____ Dollars and Cents	EA	100		
7a	Additional Common Fill _____ Dollars and Cents	CY	250		
7b	Additional Crushed Stone _____ Dollars and Cents	CY	100		
8	Temporary Sewer Bypass _____ Dollars and Cents	LS	1		
9a	Wire-backed Silt Fence _____ Dollars and Cents	LF	4,200		
9b	12" Coir Logs _____ Dollars and Cents	LF	4,200		

Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
9c	Coir Mats _____ Dollars and Cents	SF	4,700		
10	Environmental Monitor _____ Dollars and Cents	ALLOW	1	\$30,000	\$30,000
11	Resource Area Restoration _____ Dollars and Cent	LS	1		
12	Contaminated Soils Disposal Allowance _____ Dollars and Cent	ALLOW.	1	\$50,000.00	\$50,000.00
13	Jacking Pit Installed and Restored _____ Dollars and Cent	LS	1		
14	Receiving Pit Installed and Restored _____ Dollars and Cent	LS	1		
15	60" Steel Casing by Pipe Jacking _____ Dollars and Cent	LF	135		
16	Removal of Obstructions During Jacking _____ Dollars and Cent	HR	80		

Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
17	42" PVC Carrier Pipe _____ Dollars and Cent	LF	135		
18	Geotechnical Monitoring _____ Dollars and Cent	LS	1		
19	Dewatering _____ Dollars and Cent	LS	1		
20	MBTA Requirements Allowance _____ Dollars and Cent	ALLOW.	1	\$250,000.00	\$250,000.00
21	Abandonment of Existing Sewer _____ Dollars and Cents	LS	1		
22	Miscellaneous Items _____ Dollars and Cent	LS	1		

TOTAL FOR BASE BID

Total Amount of Bid (**Basis of Award**) for items 1 through 22, inclusive:

\$

(Amount in figures)

(Amount in words)

Basis of Award: The basis of award shall be at the Owner's sole discretion. The total of the Base Bid (items 1 through 22, inclusive) shall be used to determine the lowest responsive bidder. Contract to be awarded to the lowest responsible and eligible bidder in compliance with Sections 39M inclusive of Chapter 30 of the General Laws of the Commonwealth of Massachusetts.

Specific items of this Contract may be eliminated or reduced in quantity to keep within limits of available funding, at the OWNER'S option.

The bidder understands that the Owner reserves the right to reject any and all bids and to waive any informality in the bidding.

The bidder, by submittal of this BID, agrees with the Owner that the amount of the bid security deposited with this BID fairly and reasonably represents the amount of damages the Owner will suffer due to the failure of the bidder to fulfill his agreements as above provided.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of thirty (30) days (Saturdays, Sundays, and legal holidays excluded) after the opening of general bids.

Should the bidder fail to fulfill any of his agreements as hereinabove set forth, the Owner shall have the right to retain as liquidated damages the amount of the bid security check or cash which shall become the Owner's property. If a bid bond was given, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.

The undersigned agrees that if the Owner accepts this BID, the bidder will duly execute and acknowledge the AGREEMENT and furnish, duly executed and acknowledged, the required CONTRACT BONDS within ten (10) days, Saturdays, Sundays, and legal holidays excluded, after notification that the AGREEMENT and other Contract Documents are ready for signature.

A performance bond in an amount equal to 100 percent of the total amount of the bid with a surety company qualified to do business in the Commonwealth of Massachusetts will be required for the faithful performance of the contract, as well as a labor and materials bond in an amount equal to 100 percent of the total bid amount.

The time for completion of this contract is 365 calendar days. Liquidated damages specified in this contract are \$1,500 per day for each calendar day beyond the contract completion date that work remains uncompleted.

The undersigned as Bidder, hereby certifies that he is aware of the applicable requirements of the Williams-Steiger Occupational Safety and Health Act of 1970. (O.S.H.A.), and all latest revisions thereto, and that this Proposal is prepared on the basis of compliance with those requirements.

The undersigned as Bidder, hereby certifies that he will maintain records in reasonable detail, which accurately and fairly reflect the financial transactions and disposition of the Bidder, in accordance with M.G.L. Chapter 30, Section 30R.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that he will comply fully with all laws and regulations applicable to awards made subject to MGL Ch. 30, Section 39M. The bidding and award of the contract will be in full compliance with Section 39M inclusive of Chapter 30 of the General Laws of the Commonwealth of Massachusetts as last revised.

The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section Twenty-Nine F of Chapter Twenty-Nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

Respectfully submitted:

(Name of General Bidder)

SEAL (if corporation)

By _____
(Signature and title of authorized representative)

Date _____

(Telephone Number)

(Business address)

(Fax Number)

(City, State, Zip)

The following documents are attached to and made a condition of the bid, and shall be filed with the bid:

- Bid Security (5%)
- Completed Bid Proposal (Section 00300, including references)
- Completed Certificate of Non-Collusion (Section 00480)
- Completed Certificate of Corporate Vote (Section 00481)
- Completed Certificate as to Payment of State Taxes (Section 00482)
- Completed Certificate as to OSHA 10 Hour Training (Section 00483)
- Completed State Debarment Disclosure Form (Section 00484)
- Completed Indemnity Agreement (Section 00520)
- All applicable MBE and WBE forms (Appendix F)

The Bidder is requested to list five (5) or more of your firm's projects in the past 10 years in the Commonwealth of Massachusetts of a similar character as required for acceptable bid. References will enable the Owner to judge the Contractor's qualifications, experience, skill, and business standing.

Project Name: _____

Project Location: _____

Contract Amount: \$ _____ Completion Date _____

Owner: _____

Contact Name: _____ Telephone: _____

Architect/Engineer: _____

Contact Name: _____ Telephone: _____

Project Name: _____

Project Location: _____

Contract Amount: \$ _____ Completion Date _____

Owner: _____

Contact Name: _____ Telephone: _____

Architect/Engineer: _____

Contact Name: _____ Telephone: _____

Project Name: _____

Project Location: _____

Contract Amount: \$ _____ Completion Date _____

Owner: _____

Contact Name: _____ Telephone: _____

Architect/Engineer: _____

Contact Name: _____ Telephone: _____

Project Name: _____

Project Location: _____

Contract Amount: \$ _____ Completion Date _____

Owner: _____

Contact Name: _____ Telephone: _____

Architect/Engineer: _____

Contact Name: _____ Telephone: _____

Add supplementary pages as necessary.

END OF SECTION 00300

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SECTION 00480

NON-COLLUSIVE AFFIDAVIT
(AFFIDAVIT FOR BIDDER)

State of _____

County of _____

being first duly sworn, deposes and says,

That it is _____, the party making the foregoing proposal or bid, that such proposal or bid is genuine and not collusive or a sham; that said bidder has not colluded, conspired, connived or agreed directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly sought by agreement or collusion, or communication or conference, with any person, to fix the bid price of its bid or any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Town of Weymouth, Massachusetts, or any person interested in the proposed contract, and that all statements in said proposal or bid are true.

Signature of:

if bidder is an individual Bidder,

if bidder is a partnership Partner,

if bidder is a Corporation Officer,

Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary Public

My commission expires: _____, 20_____

END OF SECTION 00480

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SECTION 00481

CERTIFICATE OF CORPORATE VOTE
(CORPORATION ONLY)

At a duly authorized meeting of the Board of Directors of _____

held on _____, it was VOTED that _____

(Name)

_____ of this company, be and hereby is authorized to execute
(Officer)

bidding, documents, contracts, and bonds in the name and on behalf of said company, and affix its corporate seal hereto; and such execution of any contract or obligation in this company's name on its behalf by such officer under seal of the company, shall be valid and binding upon this company.

I hereby certify that I am the clerk of the above named corporation and that

_____ is the duly elected officer as above of said company, and that the above vote has not been amended or rescinded and remains in full force and effect as the date of this contract.

Clerk

Date

Affix Corporate Seal

END OF SECTION 00481

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SECTION 00482

CERTIFICATE AS TO PAYMENT OF STATE TAXES

Pursuant to M.G.L. Chapter 62C, Section 49A, I certify under the penalties of perjury that I, to the best of my knowledge and belief, have filed all state tax returns and paid all state taxes required under law.

Social Security Number or
Federal Identification Number

Signature of Individual or Corporate Name

By: _____
Corporate Officer (if applicable)

Date: _____

END OF SECTION 00482

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SECTION 00483

OSHA 10-HOUR TRAINING

A contractor will not be eligible for award of a contract unless such contractor has submitted the following certification, which is deemed a part of the resulting contract:

_____ certifies that:

All employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

(Signature of authorized representative of Contractor)

END OF SECTION 00483

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SECTION 00484

STATE DEBARMENT DISCLOSURE FORM

The undersigned certifies under penalties of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth of Massachusetts under the provisions of Section 29F of Chapter 29 of the General Laws, or any other applicable debarment provisions of any other Chapter of the General Laws, or any Rule or Regulation promulgated thereunder.

Date _____

Name of Bidder

By: _____
Signature

Print Name & Title of Person Signing

Address

City, State, Zip

END OF SECTION 00484

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TOWN OF WEYMOUTH

TERMS AND CONDITIONS

SUPPLIES & SERVICES

The Town of Weymouth, acting by and through its duly authorized Mayor, ("Town"), with a principal place of business at **75 Middle Street, Weymouth, Massachusetts 02189**, put forth the following as the **Terms and Conditions** for the provision of "supplies & services".

Description of Supplies & Services to be provided. The Vendor will provide to the Town the following "**supplies & services**" as described in the **Invitation for Bid**, _____ and attached hereto and made a part hereof this contract.

1) *Duration of this Contract.* The term of this contract shall be from the **AWARD date** through the completion date in the **Bid Specification**.

2) *Time for Performance of Services.* Time is of the essence for the provision of all services made under this bid. The Vendor shall commence work under the contract immediately upon award of contract and shall provide all purchased services to the Town before end date to be determined by contract.

3) *Enumeration of Contract Documents.* The following list of documents form the entire agreement between the Town and Vendor and are fully a part of the contract as if attached to this document or repeated herein:

- a. Amendments, modifications, or other mutually agreed upon change orders;
- b. This Contract;
- c. The Towns "Invitation for Bid," or other such bid solicitations;
- d. The Vendor's response to the Town's bid solicitations;
- e. All required certifications, permits, or licenses;
- f. Certificates of Insurance;
- g. Certificate of Corporate Vote, or other authorization to act; and
- h. Certificate of Corporate Status or proof of legal organizational status.
- i. W-9 form

If a conflict arises between any of the documents listed above, the order of precedence shall be that language contained in the document higher in the list shall prevail over any conflicting document lower in the list of documents.

4) *Designated Representatives.* The Town designates **John MacLeod – CPO and Director of Asset Management and Kenan J. Connell, Director of Public Works** and the Vendor designates _____ (name), _____ (title), as their authorized representatives to provide approvals, directives, and permissions **including changes**,

and to receive notices or other communications under this contract at the addresses stated above.

5) ***Manner in which the Vendor Shall be Paid by the Town.*** The Vendor shall submit an **invoice to the Department of Public Works** with any and all reasonable supporting documentation or information requested by the Town, such as, for example, but without limitation, the value of the supplies provided and services performed. Upon satisfactory review of said invoice and documentation, the Town shall promptly remit payment to the Vendor.

6) ***Required Insurance.*** The Vendor shall maintain the following required insurance coverage.

- a. **General Comprehensive Liability in the amount of \$1,000,000 for each occurrence and \$3,000,000 in the aggregate;**
- b. **Automobile Liability (applicable for any vendor/consultant who has an automobile operating exposure) in the amount of \$1,000,000 for bodily injury and property damage per accident;**
- c. **Workers' Compensation and Employer's Liability in the amount as may be required by Massachusetts General Laws Chapter 152; and**
- d. **Umbrella Liability of \$2,000,000 for each occurrence and \$2,000,000 in the aggregate.**
- e. **Errors and Omissions insurance if applicable (for Professional Services).**

The Vendor shall name the Town as an “additional insured” under all insurance coverages required by this contract, with the exception of workers’ compensation insurance. The Vendor shall further provide the Town with a copy of the current “additional insured” endorsement page reflecting that the Vendor added the Town as an additional insured for **each** insurance policy to which the Vendor added the Town.

The Town and Vendor acknowledge that the types of insurance and coverage limits listed herein are the minimum necessary for the Town to award this bid/contract to the Vendor. The Town does not intend the required types of insurance coverage in any way limits the Vendor’s liability for any damages arising from the Vendor’s performance of services under this bid/contract.

The Vendor shall maintain the listed “insurance coverage” throughout the duration of this bid/contract. If, at any time while this bid/contract is in effect, any of the listed insurance coverages should lapse, the Vendor shall immediately notify the Town. Within thirty (30) days of any such lapse, the Vendor shall provide the Town with new “certificates of insurance” coverage.

7) ***Degree of Care Owed by the Vendor.*** The Vendor represents that it will perform its services for the Town using the degree of care and skill ordinarily exercised consistent with the standards applicable to persons performing similar services under similar conditions and circumstances in the same or nearby locality.

8) ***Non-assignability of this Agreement.*** The Vendor shall not delegate, assign, or transfer its duties or interests in this bid/contract without the prior, express written consent of the Town. If the Town approves assignment, this contract shall be binding upon the Vendor's assigns, transferees, and successors in interest.

9) ***Contract Modification or Amendment.*** Upon execution of the contract, the Town and Vendor may modify or amend this contract from time to time, but only in writing by a prior, specific authority duly executed by both the Town and Vendor, as of the date of the amendment.

10) ***Non-Waiver.*** Neither the Town nor Vendor shall construe the failure of the other to enforce at any time any contract provisions as a waiver of the right of other to enforce any contract provision.

11) ***Prevailing Statutory Authority.*** The ***Laws of the Commonwealth of Massachusetts*** and the ***Code of Ordinances, Town of Weymouth, Massachusetts*** govern the validity, interpretation, construction, and performance of this contract. The Town and Vendor agree that this bid/contract shall be construed to include all terms required to be included by Massachusetts General Laws, or any other laws, as though such terms were set forth in full. Any dispute arising out of or relating to this bid/contract, if brought, *shall only be brought in Norfolk County, Massachusetts.*

12) ***Vendor's Obligation to Comply with Existing Laws.*** The Vendor warrants that it will comply with all applicable laws, regulations or ordinances affecting the successful completion of the contract, including but not strictly limited to laws, regulations, or ordinances related to public bidding, procurement, municipal finance, tax, labor law, reporting of employees and contractors, withholding and remitting child support payments, and prevailing wage laws.

The Vendor represents and warrants that it does not discriminate on the grounds of race, color, religious creed, national origin, ancestry, sex, gender identity, homelessness, age, inquiry as to a criminal record, handicap disability, mental illness, retaliation, sexual harassment, sexual orientation, genetics, and active military service. The Vendor shall comply with all applicable laws, ordinances, rules, regulations, and orders pertaining to the protection of work, property, person, and employees.

13) ***Termination.*** After execution of the Contract either the Town or Vendor may terminate this contract for any reason by providing at least ten (10) days advance, written notice to the signatories for the Town or the Vendor as the case may be. In case of a written termination by the Town, the Vendor shall cease performing all services or delivery of all supplies under this contract, with the exception of any work, in the opinion of the Town, necessary to bring the work in progress to a reasonable and safe condition. The Vendor shall then submit a final bill based only on work actually performed. There shall be no penalty for early termination.

14) ***Indemnification.*** The Vendor agrees, to the greatest extent permitted by law, to defend, indemnify and hold harmless the Town, its agents, servants, employees, successors, heirs, executors, insurers, attorneys, administrators and all other representatives, of and from any and all claims, liabilities and actions for damages or other relief, whether sounding in

bid/contract, tort, or otherwise, on account of or in any way arising out of or relating to the supplies and services purchased under this bid/contract, including but not limited to incidents involving the Town's negligence. The Vendor's duty to defend shall immediately accrue and be owing upon the utterance of such a claim by any person or entity regardless of merit and shall not be dependent upon a finding of negligence or any other finding of fact at trial. The duty to defend shall be absolute and will include and shall not be defeated or in any way undermined by the utterance of claims not covered by this bid/contract. The Town may assume its own defense after proper notice to the Vendor. If the Town assumes its own defense, the Vendor shall pay the Town its reasonable attorney's fees, costs, and expenses. If the Town assumes its own defense, the Vendor shall continue to have the duty to indemnify and hold harmless the Town.

15) ***Condition Precedent to Any Litigation.*** If a disagreement arises from or relates to this bid/contract, the supplies provided, or the services performed and as a condition precedent to the commencement of any litigation between them, the Town and Vendor agree to attempt to resolve any disagreement through direct negotiations between ***senior representatives*** of each party. If direct negotiations do not resolve the disagreement, the Town and Vendor agree to consider using mutually acceptable nonbinding alternative dispute resolution to resolve any disagreements without litigation.

16) ***Effect of final payment.*** The acceptance of final payment by the Vendor shall constitute a waiver of all claims against the Town by the Vendor arising under this bid/contract.

17) ***Materiality of Any Breach.*** All words, clauses, terms, sentences, paragraphs, portions, parts, paragraphs, and sections of this bid/contract are material. A breach by either the Town or Vendor shall not constitute an excuse by the other party to fail to fully perform all other words, clauses, terms, sentences, paragraphs, portions, parts, paragraphs, and sections of this contract.

18) ***No Ambiguity.*** All words, clauses, terms, sentences, paragraphs, portions, parts, paragraphs, and sections of this bid/contract, and this bid/contract as a whole, are unambiguous.

19) ***No Presumption against Drafting Party.*** The Town and Vendor agree that the rule of construction that any ambiguities are to be resolved against the drafting party will not be employed in any interpretation of this bid/contract.

20) ***Integration of this Bid/Contract.*** This bid/contract, including all attachments listed above, embodies the entire agreement between the Town and Vendor, and each acknowledges that the other made no inducements, promises, terms, conditions, or obligations other than those expressly contained within the written terms of this bid/contract. The written bid/contract supersedes all prior agreements, understandings, or past practice between the Town and Vendor.

21) ***Severability.*** If any court of competent jurisdiction holds any portion of this bid/contract to be illegal, invalid, or unenforceable, the Town and Vendor agree that any such order shall not affect any other remaining term, clause, phrase, paragraph, section, or provision and all shall remain in full force and effect.

22) ***No Third-Party Beneficiaries.*** There are no third-party beneficiaries to this bid/contract.

23) ***The Vendor's Status as an Independent Contractor.*** The Vendor will act as an independent contractor and not as an employee or agent of the Town in performing the services required by the bid/contract.

24) ***Non-Appropriation.*** The Town's obligation to make payments during any Town fiscal year succeeding the current fiscal year shall be subject to availability and appropriation of funds. The Town shall have the right to terminate the bid/contract when whichever level of government—Federal, state, or local—fails to appropriate or otherwise make available funds to support continuation of performance of this bid/contract in a subsequent fiscal year.

25) ***The Vendor's Contract Documents Subject to Public Records Law.*** The Vendor agrees that this bid/contract, related purchase orders, related pricing documents, and invoices will be public documents, and may be available for public and private distribution in accordance with the Public Records Law, General Laws c. 66, *et seq.* The Vendor will provide the Town copies of any documents requested under this law at no charge to the Town or the requestor.

26) ***The Vendor's Contract Documents Subject to Audit.*** The Town shall have the right, at reasonable times, at a site designated by mutual agreement, to audit the books, documents, and records of the Vendor to the extent that the books, documents, and records relate to costs or pricing data for the bid/contract. The Vendor agrees to maintain records that will support the prices charged and costs incurred for the bid/contract. The Vendor shall preserve books, documents, and records that relate to costs or pricing data for the bid/contract for a period of three (3) years from date of final payment. The Vendor shall give full and free access to all records to the Town and its authorized representatives.

27) ***Certification as to Non-Collusion.*** The Vendor certifies, pursuant to **General Laws c. 30, § 39M and c. 30B, § 10**, that under the penalties of perjury that this bid or proposal is in all respects bona fide, fair, and has been made and submitted in good faith and without collusion or fraud with any other person, meaning any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

28) ***Certification as to Payment of State Taxes.*** The Vendor certifies, pursuant to General Laws c. 62C, § 49A, that under the penalties of perjury that the Vendor complied, is complying, and will comply during the terms of this bid/contract with all laws of the Commonwealth of Massachusetts relating to taxes.

29) ***Certification as to "Conflict of Interest" Laws.*** The Vendor certifies that no official or employee of the Town has a financial interest in this bid/contract or in the expected profit to arise from the bid/contract, unless the Vendor and the Town employee or official both have notified in writing the Mayor, with a copy to the Town Solicitor, that the Vendor and the employee fully complied with the provisions of General Laws c. 43, § 27 (Interest in Public Contracts by Public Employees) and of provisions of General Laws c. 268A, § 20 (Conflict of Interest Law).

30) ***Execution of Counterparts.*** The Town and Vendor may execute this bid/contract, or any subsequent amendments, in any number of counterparts. The Town and Vendor agree each such counterpart will be considered and enforced as if an original and all counterparts together shall constitute the same.

31) ***Facsimile Signatures are Valid.*** The Town and Vendor agree that they may receive and consider as facsimile signatures electronic signatures of authorized individuals, which the Town and Vendor agree either may enforce as if valid, original written signatures. "Facsimile signature" means, for purposes of this bid/contract, a reproduction of the manual signature of an authorized officer of either the Town or Vendor.

32) ***Warranty of Authority.*** The person who signs this document on behalf of the Vendor acknowledges, warrants, and represents under the pains and penalties of perjury with his or her signature the following: he or she (a) is legally and mentally competent to execute this document; (b) is of legal age; (c) has the authority to bind with his or her signature, all plaintiffs in this action; (d) has carefully read all of the provisions of this bid/contract with care and with the advice and counsel of any attorney of record and any other attorneys of his or her choice; and (e) knows and fully understands each and every word, clause, term, sentence, paragraph, portion, part, paragraph, and section of this bid/contract, and this bid/contract as a whole. In affixing his or her signature below, he or she has affixed his or her signature to this document intentionally, willingly, and free from any compulsion or duress and as his or her own free act and deed after having obtained the advice and counsel of any attorney of record and any other attorneys of his or her choice.

Authorized Signer	Title	Date
-------------------	-------	------

These TERMS & CONDITIONS MUST be signed, and by an authorized signatory, in order to be considered.

SECTION 00520

INDEMNITY AGREEMENT

In consideration for award of the **Lower Central Interceptor Improvements**, by the Town of Weymouth, hereinafter referred to as INDEMNITEE, to the CONTRACTOR/BIDDER:

_____ hereinafter referred to as INDEMNITOR, and for other good and valuable consideration, said INDEMNITOR agrees to hold INDEMNITEE, Town of Weymouth, and its various departments and employees harmless from any and all liability, loss or damage that INDEMNITOR may suffer of claims, demands, costs, including attorneys fees, or judgement or other actions against it by reason of any and all work done by on behalf of the INDEMNITOR in connection with the above-referenced Contract.

Principal:

By: _____

(Title) _____
(SEAL)

Address

END OF SECTION 00520

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SECTION 00550

NOTICES

NOTICE OF AWARD

TO: _____

PROJECT DESCRIPTION: *Lower Central Interceptor Improvements*

The Owner has considered the Proposal submitted by you for the above described Work on _____ in response to its Invitation to Bid and Instructions to Bidders.

You are hereby notified that your Proposal has been accepted for Items totaling the amount of \$_____.

You are required by the Instructions to Bidders to execute the Contract Agreement and furnish the required Contractor's Performance Bond, Payment Bond and certificates of insurance within ten (10) days from the date of this Notice of Award.

If you fail to execute said Agreement and to furnish said Bonds and Insurance within ten (10) days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Proposal as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner. Dated this _____ day of _____, 2025.

By Its Director of the Public Works:

Kenan Connel, P.E. Date

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged, this, the _____ day of _____, 2025

By: _____

Title: _____

NOTICE TO PROCEED

TO: _____

DATE: _____

PROJECT: ***Town of Weymouth***
Lower Central Interceptor Improvements

You are hereby notified to commence the Work in accordance with the Agreement dated _____ . In accordance with the Instructions to Bidders, you are to complete all work within **365** calendar days commencing on the date of this Notice to Proceed. The date of completion for all work is therefore _____ .

Town of Weymouth, Massachusetts

By: _____
Director of Public Works

END OF SECTION 00550

SECTION 00610

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS,

That we, _____, organized under the laws of the State of _____, and having a usual place of business in _____, as principals, and _____, organized under the laws of the State of _____, and having a usual place of business in _____, as surety, are are holden and stand firmly bound and obligated unto the Town of Weymouth, Massachusetts, as obligee, in the sum of _____ (\$ _____) Dollars, lawful money of the United States of America, to and for the true payment whereof, we hereby bind ourselves, and each of us, our heirs, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said principal has, by means of a written agreement, dated _____, entered into a contract with the said obligee for the **Lower Central Interceptor Improvements**, a copy of which agreement is attached hereto and by reference, made a part hereof.

NOW, THEREFORE, the conditions of this obligation is such that if the said principal shall well and truly keep and perform all the undertakings, covenants, agreements. terms and conditions of said contract on his part to be kept and performed, during the original term of said contract and any extensions thereof that may be granted by the Town of Weymouth, Massachusetts with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall be null and void; otherwise it shall be and remain in full force, virtue and effect.

In the event that the work under said contract is abandoned by the principal, or is terminated by the Town of Weymouth, Massachusetts under the provisions of sections of said Contract, said

surety hereby further agrees that said surety shall, if requested in writing by the Town of Weymouth, Massachusetts, take such action as is necessary to complete the work under said contract. And the said surety, for value received, hereby stipulates and agrees that no change in. or extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder, or to the Specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the Specifications.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____ in the year Two Thousand and Twenty Five.

Important: Attach herewith proof of authority of officers or agents to sign Bond.

Principal:

Surety:

By: _____

By: _____

(Title) _____

(Title) _____

(SEAL)

(SEAL)

Address

Telephone Number

Fax Number

END OF SECTION 00610

SECTION 00620

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

That we, _____ organized under the laws of the State of _____ and having a usual place of business in _____, as principal, and _____ organized under the laws of the State of _____ and having a usual place of business in _____, as surety, are holden and stand firmly bound unto the Town of Weymouth, Massachusetts as obligee, in the sum of _____ (\$ _____) Dollars lawful money of the United States of America, to and for the true payment whereof, we hereby bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said principal has, by means of a written agreement, dated _____ entered into a contract with the said obligee for the **Lower Central Interceptor Improvements**, a copy of which agreement is attached hereto and by reference made a part hereof.

NOW THEREFORE, The conditions of this obligation is such that if the principal shall pay for all labor performed or furnished and for all materials used or employed in said contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, extensions of time, changes or additions being hereby waived, then this obligation shall be null and void; otherwise it shall be and remain in full force, virtue and effect.

IN WITNESS WHEREOF, the above-bounded parties have hereunto set our hands and seals this _____ day of _____ in the year Two Thousand and Twenty Five.

Important: Attach herewith proof of authority of officers or agents to sign Bond.

PRINCIPAL:

SURETY:

By:_____

By:_____

(Title)_____

(Title)_____

END OF SECTION 00620

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



Issued and Published Jointly by



These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives*:
 1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,”

“acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. *Bonds:* When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

- B. *Evidence of Contractor's Insurance:* When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner's Insurance:* After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

- a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
- b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day

after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 2. abnormal weather conditions;
 3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

- A. *Limitation on Use of Site and Other Areas:*
 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and

procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments:*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

- b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- 2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
- 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
- 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
 - 1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
 - 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
 - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming

aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
 - 1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
 - d. Contractor gave the notice required in Paragraph 5.05.B.
 - 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 - 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related

thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the

Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and

documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
 - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
 - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).
 - 4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
 - 1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
 - 2. claims for damages insured by reasonably available personal injury liability coverage.
 - 3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:
 - a. Such insurance shall be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 3. Broad form property damage coverage.
 4. Severability of interest.
 5. Underground, explosion, and collapse coverage.
 6. Personal injury coverage.
 7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
 8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.
- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be

maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

- I. *General provisions:* The policies of insurance required by this Paragraph 6.03 shall:
1. include at least the specific coverages provided in this Article.
 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
 5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials

and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
 5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
 6. extend to cover damage or loss to insured property while in transit.
 7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
 8. allow for the waiver of the insurer's subrogation rights, as set forth below.
 9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
 10. not include a co-insurance clause.
 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
 12. include performance/hot testing and start-up.
 13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

- C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of

payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor

may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is not objectionable to Owner.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or-equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 Substitutes

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
 - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
 - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
 - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - a. shall certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design,
 - 2) be similar in substance to that specified, and
 - 3) be suited to the same use as that specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct

- contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from that specified, and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.
- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss;

and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples:*

- a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner

may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal;
 - 6. the issuance of a notice of acceptability by Engineer;
 - 7. any inspection, test, or approval by others; or
 - 8. any correction of defective Work by Owner.
- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor

or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility

owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.
- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will

not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
 - 1. *Change Orders:*
 - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
 - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.
3. *Field Orders:* Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
 1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the

requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
 2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
 3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
 - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
 - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 - 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
 - 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
 - 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns

from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
 - g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:
 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee:* When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.
- E. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:* Contractor agrees that:
 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:* Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required

by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.
- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

- F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for

Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

- c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
 6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. Reductions in Payment by Owner:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. the Work is defective, requiring correction or replacement;

- g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. the Contract Price has been reduced by Change Orders;
 - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
 - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - l. there are other items entitling Owner to a set off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons

therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
 - 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all disputes that Contractor believes are unsettled; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner

and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- C. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.
- D. *Payment Becomes Due:* Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such other adjacent areas;
 - 2. correct such defective Work;
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this Article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
 - 2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this Article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 00800

SUPPLEMENTAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC No. C-700, 2013 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not specifically amended or supplemented hereby remain in full force and effect.

ARTICLE 1. DEFINITIONS AND TERMINOLOGY

SC-1.01.A.13

Add the following language at the beginning of the definition entitled "Contract Documents" in the General Conditions:

The Invitation to Bid, Instructions to Bidders

SC-1. 01.A.28

Add the following language to the definition entitled "Owner" in the General Conditions:

The "Owner" shall mean the Town of Weymouth, Massachusetts.

SC-1. 01.A.40

Delete the definition of Substantial Completion in the General Conditions in its entirety and add the following in its place:

The Work required by the Contract has been completed except for work having a Contract Price of less than one percent of the then adjusted total contract price, or substantially all of the Work has been completed and opened to Owner's use except for minor incomplete or unsatisfactory work items that do not materially impair the usefulness of the Work required by the Contract.

SC-1. 01.A.49

Add the following definition to the General Conditions:

"State" shall mean the Commonwealth of Massachusetts.

ARTICLE 2. PRELIMINARY MATTERS

SC-2.05

Add the following paragraphs immediately after paragraph 2.05.A.3 of the General Conditions which is to read as follows:

2.05.A.4 Before any work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to ENGINEER, certificates of insurance (and other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with the requirements of Article 6.

2.05.A.5 Contractor shall include and identify on the certificate of insurance, indemnification as required by Article 7.18.

ARTICLE 3. DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01

Add the following paragraphs immediately after paragraph 3.01.A of the General Conditions which is to read as follows:

3.01.A.1 Each and every provision of law and clause required by law to be inserted in the Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though they were included herein. If through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

3.01.A.2 Sections of Division 1 - General Requirements govern the execution of the work of all sections of the specifications.

ARTICLE 4. COMMENCEMENT AND PROGRESS OF THE WORK

SC 4.01

Delete paragraph 4.01 in its entirety and insert the following in its place:

4.01 The Contract Time will commence to run on the day indicated in the Notice to Proceed.

SC-4.03.A

Add a new paragraph at the end of paragraph 4.03.A of the General Conditions which is to read as follows:

“4.03.B ENGINEER may check the lines, elevations, reference marks, batter boards, etc., set by CONTRACTOR, and CONTRACTOR shall correct any errors disclosed by such check. Such a check shall not be considered as approval of CONTRACTOR's work and shall not relieve CONTRACTOR of the responsibility for accurate and satisfactory construction and completion of the entire Work. CONTRACTOR shall furnish personnel to assist ENGINEER in checking lines and grades.”

SC-4.04

Add the following paragraph after paragraph 4.04.A.2 of the General Conditions:

"3. The CONTRACTOR's resident superintendent shall attend monthly progress meetings at the site of the work with the ENGINEER and others as appropriate to review schedule status and such other pertinent subjects as may be listed on the agenda by the ENGINEER."

ARTICLE 5. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.01

Add a new paragraph immediately after paragraph 5.01.A of the General Conditions which is to read as follows:

“5.01.A.1 If all lands and rights-of-way are not obtained as herein contemplated before construction begins, CONTRACTOR shall begin the Work upon such land and rights-of-way as OWNER has previously acquired and no claim for damages whatsoever will be allowed by reason of the delay in obtaining the remaining lands and rights-of-way. Should OWNER be prevented or enjoined from proceeding with the Work, or from authorizing its prosecution, either before or after the commencement, by reason of any litigation, or by reason of its inability to procure any lands or rights-of-way for the Work, CONTRACTOR shall not be entitled to make or assert claim for damage by reason of said delay, or to withdraw from the Agreement except by consent of OWNER. Time for completion of the Work will be extended as provided in Article 11, to such time as OWNER determines will compensate for the time lost by such delay.”

SC-5.04

Add a new paragraph immediately after paragraph 5.04.D of the General Conditions which is to read as follows:

“5.04.E Adjustments resulting from actual subsurface or latent physical conditions from those indicated will be in accordance with Massachusetts General Law, Chapter 30, Section 39N and the applicable provisions of the Contract Documents.”

ARTICLE 6. BONDS AND INSURANCE

SC-6.02

Add a new paragraph immediately after paragraph 6.02.J of the General Conditions which is to read as follows:

"A. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with this Article 6 on the basis of its not complying with the Contract Documents, OWNER will notify CONTRACTOR in writing thereof within thirty days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.01.B. CONTRACTOR will provide such additional information in respect of insurance provided by him as OWNER may reasonably request."

SC-6.03

The limits of liability for the insurance required by paragraph 6.03 of the General Conditions shall provide the following coverages for not less than the following amounts or greater where required by Laws and Regulations:

6.03.A Workers' Compensation.

- | | | |
|-----|-----------------------|-------------|
| (1) | Worker's Compensation | \$1,000,000 |
| (2) | Employer's Liability | \$1,000,000 |

6.03.B and 6.03.C Comprehensive General Liability including Operations/Premises, Contractor's Protective, Products/Completed Operations, and Personal Injury liabilities:

- | | | | |
|-----|--|-------------|------------------|
| (1) | Bodily injury: | \$1,000,000 | Each occurrence |
| | | \$3,000,000 | Annual aggregate |
| (2) | Property damage, including explosion, collapse and underground coverage: | \$1,000,000 | Each occurrence |
| | | \$3,000,000 | Annual aggregate |
| | Property damage liability insurance shall provide coverage for property in the care, custody and control of the insured. | | |
| (3) | Personal injury, with employment exclusion deleted: | \$3,000,000 | Annual aggregate |

The Contractual Liability required by paragraph 6.03.C of the General Conditions shall provide coverage for not less than the following amounts:

- | | | | |
|-----|----------------|-------------|------------------|
| (1) | Bodily injury: | \$2,000,000 | Each occurrence |
| | | \$3,000,000 | Annual aggregate |

(2)	Property damage, including explosion, collapse and underground coverage:	\$1,000,000	Each occurrence
		\$3,000,000	Annual aggregate
(3)	General Aggregate	\$2,000,000	

6.03.D Comprehensive Automobile Liability including owned, hired and non-owned vehicles:

(1)	Bodily injury:	\$1,000,000	Each person
		\$1,000,000	Each accident
(2)	Property damage	\$1,000,000	Each occurrence

SC-6.04

Delete paragraph 6.04 of the General Conditions in its entirety and insert the following in its place:

6.04.A CONTRACTOR shall purchase and maintain a separate Owner's Protective Liability policy, issued to OWNER at the expense of CONTRACTOR, including OWNER and ENGINEER as named insured. This insurance shall provide coverage for not less than the following amounts:

6.04.A.1	Bodily Injury:	
	Each Occurrence	\$1,000,000
6.04.A.2	Property Damage:	
	Each Occurrence	\$1,000,000
	Annual Aggregate	\$1,000,000

SC-6.05

Delete Paragraph 6.05.A of the General Conditions in its entirety and insert the following in its place:

"A. CONTRACTOR shall purchase and maintain, until final payment, property insurance upon the Work at the site in an amount equal to the total bid price for the completed construction. This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, shall insure against the perils of fire and extended coverage, shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and shall include damages, losses and expenses rising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). This insurance shall be provided on the completed value form. If not covered under the "all risk" insurance or otherwise provided in these Supplementary Conditions, CONTRACTOR shall purchase

and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment."

Delete Paragraph 6.05.B of the General Conditions in its entirety and insert the following in its place:

"B. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER by certified mail and will contain waiver provisions in accordance with paragraph 6.06.B."

SC-6.07

Delete paragraph 6.07.A of the General Conditions in its entirety.

Delete paragraph 6.07.B of the General Conditions in its entirety.

Delete paragraph 6.07.C of the General Conditions in its entirety.

ARTICLE 7. CONTRACTOR'S RESPONSIBILITIES

SC-7.06

Add the following new paragraph as follows:

"7.06.J.1 OWNER or ENGINEER may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to CONTRACTOR in accordance with CONTRACTOR's Applications for Payment on account of the particular Subcontractor's, Suppliers, other person's, or other organization's Work."

SC-7.06

Add the following language at the beginning of paragraph 7.06.L of the General Conditions:

"Except as otherwise required by Massachusetts General Law, Chapter 149, Section 44F,"

SC-7.09

Add the following language at the end of paragraph 7.09.A of the General Conditions:

"7.09.A.1 The materials and supplies to be used in the Work under this Contract are exempt from the Sales and Use Tax of the Commonwealth of Massachusetts. Contractor shall obtain the proper

certificates, maintain the necessary records, and otherwise comply with all applicable requirements governing the exemption from sales tax.”

SC-7.16

Add the following new paragraph immediately after paragraph 7.16.E of the General Conditions, which is to read as follows:

“7.16.F The accuracy of all such information submitted by the Contractor is the responsibility of the Contractor. In reviewing Shop Drawings, Samples, and similar submittals, the Engineer shall be entitled to rely upon the Contractor’s representation that such information is correct and accurate.”

ARTICLE 8. OTHER WORK AT THE SITE

SC-8.03

Delete paragraph 8.03.D of the General Conditions in its entirety, and insert the following in its place:

“8.03.D Should CONTRACTOR cause damage to the work or property of any separate contractor at the site, or should any claim arising out of CONTRACTOR'S performance of the Work at the site be made by any separate contractor against CONTRACTOR, OWNER, ENGINEER, ENGINEER'S Consultants, or any other person, CONTRACTOR shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER, ENGINEER, and ENGINEER'S Consultants, harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers, architects, attorneys, and other professionals, and court and arbitration costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any separate contractor against OWNER, ENGINEER, or ENGINEER'S Consultants, to the extent based on a claim arising out of the CONTRACTOR'S performance of the Work. Should a separate contractor cause damage to the Work or property of CONTRACTOR or should the performance of Work by any separate contractor at the site give rise to any other claim, CONTRACTOR shall not institute any action, legal or equitable, against OWNER, ENGINEER, or ENGINEER'S Consultants or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from OWNER, ENGINEER, or ENGINEER'S Consultants, on such damage or claim. If CONTRACTOR is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor and OWNER and CONTRACTOR are unable to agree to the extent of any adjustment in Contract Times attributable thereto, CONTRACTOR may make a claim for an extension of times in accordance with Article 12.02. An extension of the Contract Times shall be CONTRACTOR'S exclusive remedy with respect to OWNER, ENGINEER, and ENGINEER'S Consultants, for any delay, disruption, interference or hindrance caused by any separate contractor. This paragraph does not prevent recovery from OWNER, ENGINEER, or ENGINEER'S Consultant, for activities that are their respective responsibilities.”

ARTICLE 9. OWNER'S RESPONSIBILITIES

SC-9.06

Delete paragraph 9.06 of the General Conditions in its entirety.

ARTICLE 10. ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.01

Add a new paragraph 10.01.B after paragraph 10.01.A of the General Conditions, which is to read as follows:

"B. Nothing contained in the Contract Documents shall be construed to create a contractual relationship of any kind (1) between the ENGINEER and CONTRACTOR, (2) between the OWNER and a Subcontractor or Subcontractors, or (3) between any person or entities other than the OWNER and CONTRACTOR. The ENGINEER shall, however, be entitled to performance and enforcement of obligations under the CONTRACT DOCUMENTS intended to facilitate performance of the ENGINEER'S duties."

SC-10.03

Add a new paragraph immediately after paragraph 10.03.A of the General Conditions as follows:

"10.03.B ENGINEER will furnish a Resident Project Representative and assistants to assist ENGINEER in observing the performance of the Work. The duties and responsibilities of the Resident Project Representative will be as enumerated in a document entitled "Duties, Responsibilities, and Limitations of the Authority of Resident Project Representative" and will be made available to CONTRACTOR at the start of his work."

ARTICLE 11. AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

SC-11.02

Add a new paragraph immediately after paragraph 11.02.A of the General Conditions which is to read as follows:

"11.02.A.1 ENGINEER'S interpretations will be made in accordance with Massachusetts General Law, Chapter 30, Section 39P."

SC-11.02

Add the following new paragraph immediately after paragraph 11.02.A of the General Conditions, which is to read as follows:

"11.02.B Upon request of the Owner or Engineer, the Contractor shall without cost to the Owner

submit to the Engineer, in such form as the Engineer may require, an accurate written estimate of the cost of any such proposed extra Work or change. The estimate shall indicate the quantity and unit cost of each item of materials, and the number of hours of work and hourly rate for each class of labor, as well as the description and amounts of all other costs chargeable under the terms of this Article. Unit labor costs for the installation of each item of materials shall be shown if required by the Engineer. The Contractor shall promptly revise and resubmit such estimate if the Engineer determines that it is not in compliance with the requirements of this Article, or that it contains errors of facts or mathematical errors. If required by the Engineer, in order to establish the exact cost of new Work added or previously required Work omitted, the Contractor shall obtain and furnish to the Engineer bona fide proposals from recognized suppliers for furnishing any material included in such Work, and shall be furnished at Contractor's expense. The Contractor shall state in the estimate any extension of time required for the completion of the Work if the change or extra work is ordered."

ARTICLE 12. CLAIMS

SC-12.01

Add a new paragraph immediately after paragraph 12.01.D.1 of the General Conditions to read as follows:

"12.01.D.1.a CONTRACTOR shall carry on the Work and maintain the progress schedule during the dispute resolution proceedings unless otherwise agreed in writing by OWNER and CONTRACTOR."

ARTICLE 13. COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-13.01

Add the following to the end of paragraph 13.01.B of the General Conditions to read as follows:

"Following the Notice of Award and prior to the execution of the AGREEMENT the OWNER, prospective contractor and, if any, each prospective filed subbid contractor shall agree on what percentage markup shall be used as direct labor costs in determination of extra work costs."

In the second sentence of paragraph 13.01.B.1 delete the word "superintendents".

SC-13.02

Delete paragraph 13.02 of the General Conditions in its entirety.

ARTICLE 15. PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC-15.01

Add new paragraphs immediately after paragraph 15.01.B.1 of the General Conditions to read as follows:

“15.01.B.1.a Only the following items of material and equipment will be accepted for delivery at the site or at a local bonded warehouse and included in progress estimates in advance of actual requirement, subject to all conditions stated below.

15.01.B.1.b Materials and equipment listed above will not be included in progress estimates until the requirements stated herein have been fulfilled.

15.01.B.1.c The Contractor must present an invoice to the Engineer for each item of material or equipment he is requesting payment for. The invoice must be broken down to show the costs for the actual equipment, and reasonable costs for O&M Manuals, spare parts, start-up certification, training, testing, final acceptance testing, and any other services required by Contract.

15.01.B.1.d Sufficient monies have been allocated in the payment requisition line items to cover all of the costs listed in "a" above, plus the costs of physically installing the equipment.

15.01.B.1.e The equipment has been submitted and approved for use in this Project.

15.01.B.1.f The Contractor has, at the time of delivery, given the Engineer written notice of the delivery using the form provided by the Engineer.

15.01.B.1.g The equipment is acceptably stored and protected. Storage in a bonded warehouse will require proof of bonding, and insurance coverage specifically for the item being stored.

15.01.B.1.h The manufacturer's short and/or long term storage requirements have been received by the Engineer, prior to payment.

15.01.B.1.i The Contractor has established a program to implement the manufacturer's required storage procedures. Said program to consist of at the very least a written schedule of daily, weekly, monthly, routine maintenance requirements for each piece of equipment. A copy of this schedule to be presented to the Engineer prior to each requisition submittal, signed by the Contractor, stating that the required maintenance has been performed.

15.01.B.1.j Signed, notarized Title Transfers, format to be furnished by the Engineer, must be furnished for each item of equipment.

15.01.B.1.k When the above have been complied with to the satisfaction of the Engineer, payment will be authorized for the full invoice values of the item of equipment, less normal retainage and less all costs for O&M Manuals, spare parts, start-up certification, training, testing, final acceptance testing, and installation.”

Delete paragraph 15.01.B.3 and insert the following in its place:

"15.01.B.3. Retainage with respect to progress payments will be five percent or, if stipulated, the maximum allowed by law."

ARTICLE 18. MISCELLANEOUS

SC-18.08

18.08 Headings:

Delete paragraph 18.08.A and replace with the following paragraph:

“18.08.A The headings or titles of any article, paragraph, subparagraph, section, subsection, or part of the Contract Documents shall not be deemed to limit or restrict the article, paragraph, section, or part.”

18.09 Legal Address of Contractor

Add the following paragraph immediately after section 18.08:

“18.09.A CONTRACTOR'S business address and his office at or near the site of the Work are both hereby designated as places to which communications shall be delivered. The depositing of any letter, notice, or other communication in a postpaid wrapper directed to the CONTRACTOR'S business address in a post office box regularly maintained by the Post Office Department or the delivery at either designated address of any letter, notice, or other communication by mail or otherwise shall be deemed sufficient service thereof upon CONTRACTOR, and the date of such service shall be the date of receipt. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by CONTRACTOR and delivered to ENGINEER. Service of any notice, letter, or other communication upon the CONTRACTOR personally shall likewise be deemed sufficient service.”

END OF SECTION 00800

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DIVISION 1

GENERAL REQUIREMENTS

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01380	Construction Photographs	01380-1
01400	Quality Assurance	01400-1
01500	Temporary Facilities and Controls	01500-1
01600	Control of Materials	01600-1
01610	Delivery, Storage and Handling	01610-1
01620	Identification Systems (Project Signs)	01620-1
01700	Contract Closeout	01700-1
01710	Cleaning Up	01710-1
01850	Traffic Management	01850-1

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SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 LOCATION OF WORK

- A. The work to be performed under this Contract shall be conducted at the site of the portion of the Lower Central Interceptor Sewer located between Commercial Street and Montcalm Street in the Town of Weymouth, Massachusetts.
- B. The Work includes, but is not necessarily limited to the following major items:
 - 1. Furnishing all materials, labor and equipment for abandonment of existing 30” reinforced concrete sewer and installation of approximately 1040 LF of new 42” PVC sewer via open trench, 275 LF of new 8” PVC sewer via open trench, 135 LF of 60” steel casing pipe and 42” diameter PVC carrier pipe via pipe jacking, and appurtenances in existing municipal sewer easement.
 - 2. Furnishing all materials, labor and equipment for removal of existing precast concrete sewer manholes and appurtenances and installation of new fiberglass reinforced plastic sewer manholes including composite frame and covers and precast manholes with standard frames and covers.
 - 3. Furnishing all materials, labor and equipment for the connection of existing municipal sewer mains to the Lower Central Interceptor Sewer manholes including replacement of existing sewer pipes up to 10 feet from manhole.
 - 4. Installation and use of environmental protection systems at the site for erosion and sediment control within the limits of work.
 - 5. Excavation and reuse of surficial soils within the wetland resource area.
 - 6. Furnishing all materials, labor and equipment for the relocation, protection, or temporary disturbance of existing utilities (i.e. water, gas, drain) to permit sewer replacement activities.
 - 7. Stabilization of disturbed wetland resource areas prior to wetland restoration activities.
 - 8. Field engineering including site layout, pre-construction surveys, and as-built

topographic survey.

9. Selective demolition, protection, and restoration of existing site improvements on public and private residential properties to permit sewer replacement activities.
 10. Restoration of temporary impacts to wetland resource areas including furnishing and installation of organic soils, erosion and sediment controls, plantings, planting soils, and seed mixes.
 11. Furnishing, installation and maintenance of all traffic control and site safety measures during the construction period, including signs, barricades, detours, maintenance of safe vehicular and pedestrian access to abutting properties, and assuring an uninterrupted supply of utility services to all abutters within the project area, at all times.
 12. Furnishing, installation, operation, and maintenance of sewer bypass pumping system and appurtenances to maintain uninterrupted sewer service of the Lower Central Interceptor Sewer and connecting sewers throughout the duration of construction.
 13. Furnishing, installation, operation and maintenance of construction dewatering system and appurtenances in accordance with various regulatory approvals.
 14. Restoration of municipal and private property including turf, landscaping, hardscapes, utilities, fencing, and trees.
 15. Obtaining necessary permits and licenses, maintaining all items required by applicable permits and licenses, and payment of fees. The Contractor will be responsible for executing the MBTA License Agreement, when obtained, and complying with all associated License requirements.
- C. The work shall also conform to such additional Drawings and addenda to these Specifications and Drawings as may be published or exhibited prior to the opening of bid proposals and to such Drawings in explanation of details, or as may be furnished by the Engineer from time to time during the construction.
- D. Work and materials which are necessary in the construction, but which are not specifically referred to in the Specifications or shown on the Drawings, but implied by the contract, shall be furnished by the Contractor at his own cost and expense, and shall be such as will correspond with the general character of the work, as may be determined by the Engineer, whose decisions as to the necessity for and character of such work and materials shall be final and conclusive. It is the intent of these Specifications to produce a complete, finished job, whether shown in every detail or not.
- E. **A time of year restriction will be observed from March 1st to June 30th on all activities that may produce noise and/or vibration adjacent to the Tide Mill Brook in order to protect sensitive life stages of rainbow smelt.**

- F. Work performed within the limits of the MBTA's Zone of Influence will be required to follow all guidelines and specifications as listed in Appendix I.

1.3 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit the use of the premises for his/her Work and for storage to allow for:
 - 1. Property Owner occupancy
- B. Coordinate use of all premises with the Town of Weymouth DPW.
- C. Contractor shall assume full responsibility for security of all his/her and his/her subcontractors materials and equipment stored on the site.
- D. If directed by the Owner or Engineer, move any stored items which interfere with operations of Owner, other contractors, or property owners.
- E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

1.4 PROPERTY OWNER OCCUPANCY

- A. Property Owners will occupy premises during performance of the work for the conduct of his/her normal operations. Coordinate all construction operations with Engineer and Owner to minimize conflict and to facilitate Property Owner usage.
- B. A general description of the work to be performed under this contract shall include, but will not be limited to, the following construction operations:
 - 1. Coordination of all construction activities with the appropriate local and State authorities and utilities.
 - 2. Attending the pre-construction conference and required job progress meetings.
 - 3. Submission of a construction schedule, list of subcontractors and submission of all required shop drawings, in a timely manner, to the Engineer for review.
 - 4. Mobilization to the site.
 - 5. Coordination of environmental protection procedures in accordance with local, state, and federal regulatory approvals.
 - 6. Protection of existing structures, facilities and equipment and installation of protection systems to mitigate potential interferences.
 - 7. Restoration of disturbed areas, outbuildings, landscaping, hardscapes, and appurtenances on residential properties to pre-construction conditions and

elevations within the limits of work.

8. Coordination with other entities owning infrastructure within the limits of work, in particular natural gas, potable water, and appurtenances.

1.5 UTILITIES

- A. The utilities shown on the plans have been located primarily from information furnished by others and are considered approximate both as to size and location. It shall be the Contractor's responsibility to locate all existing utilities and to protect same from damage or harm. All utilities interfered with or damaged shall be properly restored, at the expense of the Contractor, to the satisfaction of the Owner and Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01010

SECTION 01024

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Under the price specified to be paid for each item, the Contractor shall furnish all materials and equipment, furnish all labor and plant and perform all operations to complete all work as indicated and specified. Provide all supervision, overhead items, bond and permit costs, protection and precautions and all other costs, incidental to the construction work, complete, and as specified, are also included.
- B. A complete, finished, working job, as intended by the general nature of these Specifications, shall be produced whether or not any particular wording or direction is omitted or inadvertently not clearly stated.
- C. Measurement for payment shall be by the Engineer, except where noted elsewhere in this Specification. Measurement for payment for lump sum items shall be on the basis of percentage of work complete and in place.
- D. Each unit or lump sum price stated in the Bid shall constitute full compensation as herein specified for each item of work completed in accordance with the Drawings and Specifications.
- E. Unit prices submitted for various items of work will be utilized for determining prices of any additional work necessary during construction.

1.2 ITEM DESCRIPTIONS

A. Item 1: Mobilization/Demobilization

- 1. The lump sum for this item shall constitute full compensation to the Contractor for the general mobilization to make the contract operational, exclusive of the cost of materials but including furnishing and maintaining the Temporary Facilities as described in Section 01500. The item shall also include the general demobilization upon closeout of the contract.
- 2. The total for mobilization/demobilization shall not exceed 5 percent of the total of all bid items excluding this item.

B. Item 2: Gravity Sewer

- 1. Under Item 2a, the unit price for this item shall constitute compensation for 8-inch PVC gravity sewer pipe as measured by the linear foot of gravity sewer furnished, installed, completed, and accepted in place. Measurement shall be along the pipe centerline without deduction for fittings or service connections.

2. Under Item 2b, the unit price for this item shall constitute compensation for 42-inch PVC gravity sewer pipe as measured by the linear foot of gravity sewer furnished, installed, completed, and accepted in place. Measurement shall be along the pipe centerline without deduction for fittings or service connections.
3. The unit price shall constitute full compensation for constructing the sewers, complete in place, as indicated on the drawings and as specified, including furnishing and installing pipe, fittings, excavation, bedding, crushed stone backfill up to the springline of the sewer pipe, sand backfill within 1 foot of pipe above springline, filter fabric, pipe anchors, tracer tape, dewatering incidental to sewer installation, select backfill material, clearing and grubbing, testing, and all work incidental thereto and not specifically included for payment under other items.
4. Sewer pipe installed but not successfully tested will be paid for at a maximum of 90 percent of the unit prices bid under Item 2 of the proposal. The remaining 10 percent will be paid upon receipt of successful test results by the Engineer. All reductions in payment due to unsuccessful testing will be made prior to normal retainage.
5. Under Item 2c, the unit price for this item shall constitute compensation for bentonite clay dams as measured by each furnished, installed, completed, and accepted in place. Measurement shall be made by actual amount of dams installed.

C. Item 3: Sewer Manholes and Appurtenances

1. Under Item 3a, the unit price for this item shall constitute compensation for 4' diameter FRP manholes as measured by each manhole furnished, installed, completed, and accepted in place. Measurement shall be made by actual amount of manholes completed.
2. Under Item 3b, the unit price for this item shall constitute compensation for 6' diameter FRP manholes as measured by each manhole furnished, installed, completed, and accepted in place. Measurement shall be made by actual amount of manholes completed.
3. Under Item 3c, the unit price for this item shall constitute compensation for 4' diameter doghouse concrete manholes as measured by each manhole furnished, installed, completed, and accepted in place. Measurement shall be made by actual amount of manholes completed. Payment shall include epoxy lining.
4. Under Item 3d, the unit price for this item shall constitute compensation for 5' diameter doghouse concrete manholes as measured by each manhole furnished, installed, completed, and accepted in place. Measurement shall be made by actual amount of manholes completed.
5. Under Item 3e, the unit price for this item shall constitute compensation for 4' diameter concrete manholes as measured by each manhole furnished, installed,

completed, and accepted in place with a standard frame and cover. Measurement shall be made by actual amount of manholes completed.

6. The unit price for items 3a through 3e includes all equipment, material, and labor associated with the placement of crushed stone base, geotextile fabric, installation and testing of new manhole, anti-flotation slab, connection to 8", 30", or 42" sewer, backfill of structure, furnish and installation of non-traffic rated composite frames and covers, manhole steps, interior drop pipes, and dewatering incidental to placement of the structure. Removal and disposal of manhole, frame and cover, pipe, backfill material and bituminous concrete shall be considered incidental to the work and shall not be measured separately for payment.
7. Sewer manholes installed but not successfully tested will be paid for at a maximum of 90 percent of the unit prices bid under Item 3 of the proposal. The remaining 10 percent will be paid upon receipt of successful test results by the Engineer. All reductions in payment due to unsuccessful testing will be made prior to normal retainage.

D. Item 4: Connection to Existing Sewer Service

1. Under Item 4, the unit price for this item shall constitute compensation for each sewer service connection furnished, installed, completed, tested and accepted in place by the Engineer.
2. Sewer connections shall be paid at the contract unit price and shall include excavation, backfill, crushed stone and select backfill, furnishing and installing the pipe, fittings, repair couplings, tracer tape, dewatering incidental to the connections, removal and disposal of sewer pipe and fittings, hazardous material abatement and disposal for asbestos cement sewer connections, and incidentals necessary to construct the sewer connections as shown on the drawings and/or as specified.
3. Sewer connections for residential buildings shall extend from the centerline of the main up to the edge of the municipal sewer easement.
4. Restoration of the ground surface shall be paid for under separate items.

E. Item 5: Rock Excavation

1. Under the unit price bid for Item 5, the Contractor shall excavate, remove, and dispose of ledge and rock from trenches and excavated areas. Included in the price bid per cubic yard shall be related costs such as drilling, blasting, and replacement with suitable gravel borrow material, removal, and disposal of excavated material.
2. Measurement for payment will be on the basis of cubic yards of ledge or rock excavated as measured by the Engineer.

3. Rock in pipe trenches shall be measured from its surface to 6-inches below the outside of the pipe and with a maximum width of two (2) feet greater than the inside diameter of the pipe. Any rock excavated to a depth or width greater than the above shall be removed and backfilled with common fill at the Contractor's expense.

F. Item 6: Exploratory Excavations

4. Under the unit price bid for Item 6, the Contractor shall excavate and refill, as directed and approved by the Engineer, such materials as are necessary to locate pipe, utilities and possible obstructions. Included under the unit price is payment for excavation, dewatering, backfill, compaction, all labor, services and equipment necessary for exploratory excavations at the connection points to the LCI and residential sewer services. Measurement for payment will be on the basis of each exploratory excavation completed as approved by the Engineer. Paving and surface restoration shall be included for payment under separate items.

G. Item 7: Earthwork

5. Under the unit price bid for Item 7a, the Contractor shall furnish and place new common fill, as specified or directed by the Engineer, for use as trench backfill. Price includes disposal of waste material. Measurement for common fill placed under Item 7a will be as measured in place, and compacted to designated thickness as shown in the trench detail or as specified.
6. Under the unit price bid for Item 7b, the Contractor shall furnish and place crushed stone, as specified or directed by the Engineer. Measurement for payment will be on the basis of cubic yards of material placed and compacted to the designated thickness as shown in the trench detail or as specified.

H. Item 8: Temporary Sewer Bypass

1. Under the lump sum bid for Item 8, the Contractor shall furnish, install, operate, and maintain a temporary sewer bypass pumping system to maintain sewer flows throughout the construction of the Lower Central Interceptor Replacement. Bid price shall include all equipment, material, labor, piping, pipe supports, fuel, and pumping associated with the temporary pumping of sewer flows along the Lower Central Interceptor as indicated on the Construction Drawings. Pricing shall also include removal of bypass pumping systems upon approval of the Engineer. Construction dependent upon successful bypass pumping will be measured and paid for separately.
2. Excavation and restoration required for bypass pumping system and appurtenances shall be considered incidental to the work and shall not be separately measured for payment.

3. Payment for the lump sum bid item for Item 8 also includes bypass of sewer flow from Tick-Tock Lane via septic truck pumping, including 1 redundant truck on standby.

I. Item 9: Environmental Protection

1. The unit price for Item 9a shall constitute full compensation for furnishing and installing the wire backed silt fence in the locations specified in the Specifications and on the Drawings. Item shall be measured for payment by the linear foot completed and accepted by the Engineer. Item shall be installed as specified.
2. The unit price for Item 9b shall constitute full compensation for furnishing and installing the 12" Coir Logs in the locations specified in the Specifications and on the Drawings. Item shall be measured for payment by the linear foot completed and accepted by the Engineer. Item shall be installed as specified.
3. The unit price for Item 9c shall constitute full compensation for furnishing and installing the Coir Mats in the locations specified in the Specifications and on the Drawings. Item shall be measured for payment by the square foot completed and accepted by the Engineer. Item shall be installed as specified.
4. The unit price for these items shall include the cost of maintenance, repair, and/or replacement of any section of environmental protection measures for which payment has been made.
5. Environmental protection measures in Item 9 are limited to those materials used within construction limits of work along the municipal sewer easement. Environmental protection measures used in the course of stockpile management, construction access, dewatering, temporary staging area, temporary sewer bypass pumping, and/or site restoration activities shall be included within Item 22.

J. Item 10: Environmental Monitor (Allowance)

1. Payment for the Environmental Monitor will be made for expenses billed to the Contractor by the Wetlands Professional in the normal course of providing supervision of environmental protection activities and stabilization and restoration of wetland resource areas. Allowance is approximate, and the actual amount to be paid may be more or less but shall match the actual amount paid to the Environmental Monitor as authorized by the Engineer. The Contractor shall record the actual amount paid to Environmental Monitor and at the end of each month. The Contractor shall submit the total amount paid during the month, in four copies, to the Engineer who will review such amounts, when verified, in monthly payment requests from the Contractor to the Owner.
2. If the Environmental Monitor expenses are greater than the stated allowance, the Contractor will be reimbursed the difference in the actual costs as billed.

Any unexpended amount will remain with the Owner as a credit on the total base bid.

3. No mark-up for the Environmental Monitor will be allowed. Only documented invoice amounts will be reimbursed to the Contractor.

K. Item 11: Resource Area Restoration

1. Payment for this lump sum item shall constitute full compensation to the Contractor for all work related to the restoration and replication of wetlands and resource areas that are not included in other items.
2. The work shall include but not be limited to grading, removal and replacement of wetland soils, stockpiling of surficial wetland soils, in situ replacement of wetland soils, protection and maintenance of wetland surficial soils, furnish and installation of wetland plantings, protection and maintenance of wetland plantings, two year warranty of wetland plantings from date of acceptance, and seeding of specified areas as required by the contract documents.
3. Replacement of plantings and reseeding of areas during the two year warranty period for all plantings shall be considered incidental to this item and not subject to payment under any other items.

L. Item 12 – Contaminated Soils Disposal Allowance

1. Under Bid Item 12, the Contractor shall be reimbursed for certain charges authorized by the Engineer for unforeseen contaminated and hazardous materials, as defined in Section 02080, discovered in the field. Payment under this item includes the removal and legal disposal of contaminated and hazardous material required and authorized by the Engineer. The allowance (ALLOW) for this item established in the Bid is an estimated figure to facilitate comparison of bids only. Payment for this item shall be based on actual subcontractor invoices and/or Contractor accounting of actual costs for labor, equipment, transport, disposal, incidentals and other appurtenant items necessary for the legal disposal of hazardous soil materials, including the timely and required notification of all encounters. Subcontractor invoices and Contractor expenses will be reimbursed at cost without markup (profit). Payment for removal and disposal of background, unregulated, or impacted soils are not included in this item. Payment for excavated materials that are reused as backfill are not included in this item.
2. No mark up for this item will be allowed. Only documented invoice amounts will be reimbursed to the Contractor.

M. Item 13: Jacking Pit Installed and Restored

1. Under the lump sum Unit Price for this item, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to perform the excavation, installation, and restoration of the jacking pit as

specified in the Contract Documents and also as directed by the Engineer. This item also includes removal and disposal of excess excavated material; temporary excavation support system designed, furnished and installed complete, furnish, install and remove working mat; protection and security around the jacking pit; All safety, cautions and maintenance of the pit during the jacking operation; backfill; removal of support of excavation; compaction and compaction testing, and protection of all utilities.

2. Measurement for payment for this item shall be on the basis of percentage of Work completed as determined in the Contractor's approved schedule of values. Payment will not be made until all required submittals have been approved by the Engineer. Further, payment will be contingent upon the Contractor meeting the requirements in the specifications for installation and restoration.

N. Item 14: Receiving Pit Installed and Restored

1. Under the lump sum Unit Price for this item, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to perform the excavation, installation, and restoration of the receiving pit as specified in the Contract Documents and also as directed by the Engineer. This item also includes removal and disposal of excess excavated material; temporary excavation support system designed, furnished and installed complete, furnish, install and remove working mat; protection and security around the receiving pit; All safety, cautions and maintenance of the pit during the jacking operation; backfill; removal of support of excavation; compaction and compaction testing, and protection of all utilities.
2. Measurement for payment for this item shall be on the basis of percentage of Work completed as determined in the Contractor's approved schedule of values. Payment will not be made until all required submittals have been approved by the Engineer. Further, payment will be contingent upon the Contractor meeting the requirements in the specifications for installation and restoration.

O. Item 15: 60" Steel Casing by Pipe Jacking

1. Under the linear foot price bid for this item the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to design, furnish and install the 60" steel casing using approved jacking installation techniques as specified in the Contract Specifications and also as directed by the Engineer. Payment under this Item includes, but is not limited to: excavation and removal of material to facilitate the jacking installation; design, furnish and install all soil stabilization required during the progress of the jacking operation as specified in the Contract Specifications and also as directed by the Engineer; furnish and install casing spacers; furnish and install high strength grout in the annular space between the casing and carrier pipes; furnish and install bulkheads and vents for filling the interior of the casing; Monitoring and filling voids; Maintenance of alignment and tolerances; Testing

and inspection; Cleaning the interior of the casing; All safety, security and cautions.

2. Payment will be measured by the linear foot of 60" steel casing pipe furnished, installed, completed, and accepted in place.

P. Item 16: Removal of Obstructions During Jacking

1. Under the unit price bid for this item, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to excavate and remove, by whatever efficient means chosen by the Contractor and approved by the Owner and Engineer, unknown obstructions encountered during pipe-jacking excavation that completely halt or interfere with pipe-jacking operations.
2. Measurement for payment for Removal of Obstructions during Jacking shall be based on the number of hours or fraction of hours during which active diligent Work is being performed to remove jacking obstructions. Fraction of hours will be rounded up to the next ½ hour. Time when the removal of the obstruction is not proceeding in a diligent manner or if Work is not directly being done to remove the obstruction will not be paid for under this item. Time in which the Contractor is delayed is not paid for under this item, only time which is being spent to remove the obstruction. Measurement for payment begins one hour after notification to the Engineer and ceases after the obstruction is removed from the excavation or broken through to a point where excavation Work can resume, as determined by the Engineer.

Q. Item 17: 42" PVC Carrier Pipe

1. Payment for this unit price item shall constitute compensation for 42-inch PVC gravity sewer pipe as measured by the linear foot of gravity sewer furnished, installed, completed, and accepted in place. Measurement shall be along the pipe centerline without deduction for fittings or service connections.
2. Carrier pipes installed but not successfully tested will be paid for at a maximum of 75 percent of their value. The remaining 25 percent of the carrier pipe value will be paid upon receipt of successful test results by the Engineer. All reductions in payment due to unsuccessful testing will be made prior to normal retainage.

R. Item 18: Geotechnical Monitoring

1. Under the lump sum Unit Price for Geotechnical Monitoring, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to perform all geotechnical monitoring as specified in Section 02115, required by the MBTA as shown in Appendix I and also as directed by the Engineer. Payment under this Item includes, but is not limited to: furnishing and installing earth support settlement and deformation

monitoring points as well as utility, ground surface and building and structure deformation monitoring points as shown on the Contract Documents and as specified; maintenance and monitoring of earth support settlement and deformation monitoring points and submission of all data to the Engineer, Town and MBTA; maintenance and monitoring of utility including vibration monitoring, ground surface and building and structure deformation monitoring points and submission of all data to the Engineer; pre-construction and post-construction building surveys; submission of shop Contract Documents and submittals as required.

2. Measurement for payment for Geotechnical Monitoring shall be on the basis of percentage of Work completed as determined in the Contractor's approved schedule of values. Payment will not be made until all required submittals have been approved by the Engineer. Further, payment will be contingent upon the Contractor meeting the requirements in the specifications for monitoring, maintenance, and submission of reports. Payment may be withheld, at the Engineer's discretion, for late submission of reporting requirements. Costs for additional monitoring points installed for the Contractor's convenience shall not be compensated for.

S. Item 19: Dewatering

1. Under the lump sum price bid for this item, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to install dewatering wells for the pipe jacking operation, as required. The Work includes but is not limited to mobilization and demobilization of the complete system(s); design of the system(s); furnishing and installing wells and treatment system(s); maintenance of the wells and treatment system(s); breakdown, transportation and set-up of the wells and treatment system(s) between on-site areas requiring treatment; sampling; reporting; maintenance of all logs and other documentation required; laboratory testing; obtain dewatering permits; coordination with permitting agencies and the Owner and Engineer; compliance with all permit requirements; removal, transportation, stockpiling, testing and disposal of all collected sediment; Dewatering Professional services; Dewatering Specialist services and all incidental Work not included for payment elsewhere.
2. Payment will be on the basis of percentage of Work completed as determined in the Contractor's approved schedule of values. Dewatering wells, installed for the purposes of dewatering the jacking and receiving pits and casing alignment as shown on the Drawings, but not properly maintained and in continuous operation in the opinion of the Engineer shall not be paid under this item. A dewatering treatment system to reduce turbidity to acceptable levels is included in the lump sum price bid for this item.
3. The Contractor shall not be compensated for other construction dewatering not associated with the dewatering of the jacking pit, receiving pit, and pipe jacking operation and under this item; Construction dewatering for Work other than

that associated with the jacking and receiving pits shall be covered in the appropriate bid items, at no additional cost to the Owner.

T. Item 20: MBTA Requirements Allowance

1. Payment for additional work required by the MBTA will be made for expenses incurred by the Contractor in the normal course of complying with permitting and license requirements. Allowance is approximate, and the actual amount to be paid may be more or less but shall match the cost of labor and materials as authorized by the Engineer. This shall include, but is not limited to, the following:
 - a. Payment for MBTA personnel, including flaggers, management staff, inspectors, etc., required by the executed license agreement.
 - b. Payment for any licensing fees required by the MBTA for execution of the license agreement.
 - c. Payment for track releveling, if required.
 - d. Replacement of fouled ballast, if required.
2. No mark up for this item will be allowed. Only documented invoice amounts will be reimbursed to the Contractor.
3. Any unexpended amount on Item 20 will remain with the Owner as a credit on the total base bid.

U. Item 21: Abandonment of Existing Sewer

1. Under the lump sum price bid for this item, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required for removal, disposal, and abandonment of the existing 30" RCP sewer, sewer manholes, and appurtenances. Payment for work under this item includes manhole abandonment in place, filling of manholes with CDF, filling of sewer pipes with CDF, caps, bulkheads, and all other work to abandon the 30" RCP Interceptor as depicted on the drawings.
2. Payment will be on the basis of percentage of Work completed as determined in the Contractor's approved schedule of values.

V. Item 22: Miscellaneous Items

1. Under the lump sum price for this Item, the Contractor shall provide all general construction services, labor, materials, supplies, consumables, and equipment necessary to complete all work required to construct the work identified on the Drawings, which is not included in Bid Items 1 through 21. This shall include, but is not limited to, the following:
 - a. Attendance at project meetings;
 - b. Construction progress photographs;

- c. Construction of temporary construction access to the site;
- d. Miscellaneous field concrete;
- e. Tree removal within sewer easement;
- f. Clearing and grubbing within the limits of work as shown on the plans;
- g. Furnishing and placement of construction mats for use in the wetland resource areas;
- h. Environmental protection measures for temporary construction staging area, dewatering activities, slope stabilization, and/or stockpile management;
- i. Site restoration of municipal and private property including turf, landscaping, utilities, and trees;
- j. Provisions for furnishing and installing the project sign;
- k. Submission of all schedules, lists, laboratory test results, materials and sources, survey documentation, and shop drawings, as required, in a timely manner to the Engineer for review and approval;
- l. Maintenance and repair of all work for one (1) year period;
- m. Perform boundary survey to physically demarcate the MBTA right-of-way (ROW) and zone-of-influence (ZOI);
- n. Coordination of all construction activities with the Engineer, Owner, Regulatory Agencies, local utilities, and police. Obtaining necessary permits and licenses, and payment of associated fees, as required, except for MBTA license fees covered under Item 20, including execution of the MBTA License Agreement, once obtained.
- o. Complete Keolis Roadway Work Protection (RWP) training by all construction personnel working within the MBTA Zone of Influence.
- p. Provide a set of clearly labelled red line as-built drawings at the completion of the project.
- q. Temporary facilities and providing required bonds and insurance, including MBTA railroad protective liability insurance (as shown in Appendix I) and hazardous materials insurance.
- r. Providing a Site-Specific Health and Safety Plan for the Contractor's employees in accordance with the minimum standards set forth in OSHA 29 CFR 1910.120 and 29 CFR 1926;

- s. Implementation of the Health and Safety Plan;
- t. Coordination of all construction activities with the Town of Weymouth and the local utility companies; and
- u. Maintenance of sewage flow from Savannah Drive starting December 1, 2025 through substantial completion.
- v. All other project related direct and indirect costs not described above.
- w. Additional MBTA submittals and requirements as shown in Appendix I including the MBTA Draft License Agreement and MBTA Engineering Coordination and Construction Guidelines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01024

SECTION 01040

PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. Coordination.
 - 2. Administrative and supervisory personnel.
 - 3. General installation provisions.
 - 4. Cleaning and protection.
- B. Progress meetings and preconstruction conferences are included in Section 01200 – “Project Meetings”.
- C. Requirements for the Contractor's Construction Schedule are included in Section 01300 – “Submittals”.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Inspect the conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner, and at no additional cost to the Owner.
- B. Manufacturer's Written Instructions: Comply with manufacturer's written installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items, and at no additional cost to the Owner.
- D. Provide attachment and connection devices and methods for securing work. Secure work true to line and level. Allow for expansion and utility movement.
- E. Recheck measurements and dimensions before starting installation or erection.
- F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material to prevent deterioration.
- G. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Install protective covering to ensure protection from damage or deterioration.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Air contamination or pollution.
 - 5. Water or ice.
 - 6. Solvents.
 - 7. Chemicals.
 - 8. Heavy traffic.
 - 9. Misalignment.

10. Unprotected storage.
11. Improper shipping or handling.
12. Theft.
13. Vandalism.

END OF SECTION 01040

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SECTION 01046
CONTROL OF WORK

PART 1 - GENERAL

1.1 EQUIPMENT

- A. Furnish equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the Contract Time. If at any time such equipment appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he/she may order the Contractor to increase the efficiency, change the character or increase the plant equipment and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his/her obligations to secure the quality of the work and rate of progress required.

1.2 PRIVATE LAND

- A. The Contractor shall not enter or occupy private land outside of easements, except by permission of the land owner.

1.3 HAULING, HANDLING, AND STORAGE OF MATERIALS

- A. The Contractor shall, at his own expense, handle and haul all materials furnished by him and shall remove any and all of his surplus materials at the completion of the work. The Contractor shall provide suitable and adequate storage for equipment and materials furnished by him that are liable to injury, and shall be responsible for any loss or damage to any equipment or materials by theft, breakage, or otherwise. The Contractor shall be responsible for all damages to the work under construction during its progress and until final completion and acceptance, even though partial payments have been made under the Contract.

1.4 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. The Contractor is required to comply with all provisions of DigSafe (www.digsafe.com). Any damage resulting from the Contractor's operations shall be repaired by him at his expense.
- B. Assistance will be given to the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including, but not limited to existing

water services, drain lines, sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.

- C. If, in the opinion of the Engineer, permanent relocation of a utility owned by the Town is required, which is not shown on the Plans or the Specifications, he may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for as extra work under Articles of the General Conditions. If relocation of a privately-owned utility is required, the Town will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Town and utility, and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies, in writing, at least 72 hours (excluding Saturdays, Sundays, and legal holidays) before excavating in any public way.

1.5 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. All newly-constructed work shall be carefully protected from injury in any way. No placing of heavy loads on it shall be allowed, and all portions injured shall be reconstructed by the Contractor at its own expense.
- B. All structures shall be protected in a manner approved by the Engineer. All such damaged portions of the work shall be completely repaired and made good by the Contractor, at his own expense, and to the satisfaction of the Engineer.
- C. If, in the final inspection of the work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship, without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction, and other work undertaken herein, for at least the guarantee period described in the Contract Documents.
- D. The Contractor shall take all necessary precautions to prevent damage to any work during and after construction, and until such work is accepted and taken over by the Owner.

1.6 CARE AND PROTECTION OF PROPERTY AND SURVEY MONUMENTS

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property, by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the Engineer.
- B. Along the location of this work, all fences, walks, bushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the Contractor shall be replaced as

soon as conditions permit. All grass areas beyond the limits of construction, which have been damaged by the Contractor, shall be graded and seeded.

- C. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any trees be cut or removed without prior notification of the Town or other person in charge. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods using only approved tools and materials.
- D. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the Bid Proposal. The Contractor is responsible for protecting and, if required, re-setting survey monuments (bounds). If a bound is in the way of required excavation, the Contractor will notify the Engineer with as much notice as possible prior to performing excavation near the bound.

1.7 REJECTED MATERIALS AND DEFECTIVE WORK

- A. Materials furnished by the Contractor and condemned by the Engineer as unsuitable or not in conformity with the Specifications shall forthwith be removed from the work by the Contractor, and shall not be made use of elsewhere in the work. Any errors, defects, or omissions in the execution of the work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good by and at the expense of the Contractor, and in a manner satisfactory to the Engineer. The Contractor shall reimburse the Owner for any expenses, losses, or damages incurred in consequence of any defect, error, omission, or act of the Contractor or his employees, as determined by the Engineer, occurring previous to the final payment.

1.8 COORDINATION WITH LOCAL AGENCIES

- A. The Contractor shall attend a Pre-Construction Meeting approximately one week prior to start of work. The contractor will provide the proposed schedule at that time (see Submittals, Section 1300).
- B. The Contractor shall attend a Site Meeting with the Town of Weymouth Conservation Administrator after installation of environmental protection measures (see Sections 01110 and 02020) to review the placement of the protection measures, proposed work within wetland resource areas, and the Order of Conditions (see Appendix D).
- B. The Engineer will have the authority to reject any work or materials that do not constitute approval by the Town and shall not relieve the Contractor of his obligations to perform the work in accordance with the Plans and Specifications.
- C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all

costs in connection therewith shall be included in the Total Price Bid in the Bid Form.

1.9 COOPERATION WITHIN THIS CONTRACT

- A. All firms or persons authorized to perform any work under this Contract shall cooperate with General Contractor and his/her Subcontractors or trades and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

1.10 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

- A. During the course of the work, the Contractor shall keep the site of his/her operations in as clean and neat a condition as is possible. He/She shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he/she shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and shall leave the entire site of the work in a neat and orderly condition.
- B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor and his/her subcontractors shall comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and elsewhere in the Specifications.
- C. The Contractor is advised that the disposal of excess excavated material in wetlands, stream corridors and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him, will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. Therefore, the Contractor will be required to remove the fill at his/her own expense and restore the area impacted.
- D. Outdoor burning of rubbish and waste material on the site will not be permitted.
- E. Disposal of volatile fluid wastes (such as mineral spirits, oil, gasoline, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.
- F. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as

promptly as practicable as work progresses and shall not be left until the end of the contract period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01046

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SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section

1.2 SUMMARY

- A. This section includes the following:
 - 1. Examination of site and conditions of construction.
 - 2. Establishment of lines, grades, easements, erosion controls, environmental protections, and coastal bank.
 - 3. Connections to existing facilities.
 - 4. Restoration and protection of public and private property.

1.3 SUBMITTALS

- A. Shop Drawings: Submit the following in accordance with Section 01300 - Submittals:
 - 1. A pre-construction survey to record the conditions of all existing buildings, utilities, and appurtenances prior to construction that includes the following:
 - a. Submit separate report for each property surveyed. Each report shall include location and description of the site; list and description of on-site improvements; results of visual inspection; color photographs; sketches as required; results of interviews. Points where deterioration has occurred shall be noted and color photographs taken to show the deterioration or other deficiencies. The absence of deficiencies shall also be recorded.
 - b. The Contractor shall request private owners to sign the report before final submission to the Engineer. If the owner refuses to sign the report, the Contractor shall so notify the Engineer.
 - c. When the preconstruction survey is of existing utilities, the report shall include location and description of site; type and owner of utility; results of visual inspection; and sketches as required.
 - d. A video survey taken while walking along the municipal sewer easement of the Lower Central Interceptor Sewer within the project limits.

- d. Two copies of the preconstruction survey report shall be submitted to the Engineer for review and approval.
 - e. Incorporated additional information and revisions required by Engineer and resubmit report.
 - f. Photograph prints shall have gloss finish, shall be furnished in a plastic holder suitable for placing in an 8.5-inch x 11-inch loose leaf binder, and shall be 4-inches by 6-inches in size. Photographs, which, in the opinion of the Engineer, produce unsatisfactory prints or digital negatives, shall be retaken by the Contractor at no additional cost to the Owner. Each photograph shall have permanently written on it an identification number for reference and a legible description indicating name of project, title of contract, number of contract, building or structure, owner, date taken, location identification, description data, Contractor's name, and Owner. The prints shall be accompanied by a disc with digital negatives. Photographs and prints shall be in color and shall have a minimum resolution of 10 megapixels.
 - g. Four copies of each approved report shall be made: two copies (one of which is the original submittal) for the Engineer, one copy shall be provided to the building owner, and one shall be retained by the Contractor.
2. A post-construction survey to record the conditions of all existing buildings, utilities, and appurtenances following Owner's acceptance of construction that includes the information contained within the preconstruction survey.
3. A post construction topographic survey shall be provided by the Contractor and shall be stamped by a Registered Land Surveyor (RLS).
- a. Topographic Survey: After completion of construction activities, a topographic survey shall be conducted by an RLS and a record drawing shall be prepared signed and sealed by the RLS, which includes the following information:
 - (1). Locating the construction control points, including establishing and maintaining permanent bench marks.
 - (2). Location of all property lines within 200 feet of the work area.
 - (3). The topographic survey work shall extend to the limit of work shown on the Drawings. Provide topographic survey with 1-ft contours and spot elevations.
 - (4). Location of all permanent utilities, and drainage structures within the work area.
 - (5). The invert elevations of all sewer and drainage structures and gravity pipe inlets and outlets.
 - (6). The Lower Central Interceptor Sewer within the limits of work in both plan view and profile view. Plan view shall be in a scale of 1" = 40'. The sewer profiles shall be in a scale of 1" = 4' in the vertical axis and in a scale of 1" = 40' in the horizontal axis.

- (6). The information obtained from this survey shall be professionally drafted on 4 mil wash off Mylar 22" x 34" sheets, using the scales specified above and shall be based on Weymouth Datum for vertical control.
 - b. The Contractor shall submit the record drawing in both Mylar form as specified above, as an AutoCAD drawing file, meeting the Town of Weymouth's AutoCAD specifications (version 2018), and as a PDF document.
- 4. Qualifications of Registered Professional Engineer, Licensed Construction Superintendent, Licensed Building Inspector, and/or Registered Land Surveyor shall be submitted for review/approval prior to start of construction.

1.4 PROJECT/SITE CONDITIONS

A. Environmental Requirements:

1. Unfavorable Construction Conditions:

- a. During unfavorable weather, wet grounds, or other unsuitable construction conditions, confine operations to work which will not be affected adversely by such conditions.
- b. No portion of Work shall be constructed under conditions which adversely affect quality or efficiency thereof, unless special means or precautions are taken to perform Work in manner acceptable to the Engineer.

B. Field Measurements:

1. Lines and Grades:

- a. All Work shall be done to lines, grades, and elevations indicated on drawings or specified herein.
- b. Elevations on the construction plans are in Weymouth Datum vertical datum and any plans required by this section are to be done in Town of Weymouth Datum vertical datum. Contractor shall be responsible for maintaining or subsequently replacing these controls to the satisfaction of the Engineer if these controls are disturbed. The Contractor shall be responsible for verifying all vertical control information that is used.
 - (1). Points shall be used as datum for work.
 - (2). Contractor shall be responsible for transferring all lines and grades from basic survey control points.
- c. Contractor to perform all additional survey, layout, and measurement work.
- d. Keep the Engineer informed, in writing, two weeks in advance, of times and places at which work is to be performed, so that horizontal

and vertical control points may be established, and any checking deemed necessary by the Engineer may be performed.

- e. Remove and reconstruct Work which is improperly located as determined by the Engineer and at no additional cost to the Owner.

2. Easements and Rights-of-Way:

- a. Easements and rights-of-way for utilities, if required, will be provided by the Owner.
- b. Confine construction operations within limits indicated on drawings and/or within limits of easements or public ways.
- c. Place construction tools, equipment, excavated materials, and pipeline materials and supplies, so as to cause least possible damage to property and interference with traffic.

3. Erosion Control Layout and Coastal Bank:

- a. Erosion control lines shall be staked out for inspection and approval by the Engineer and Town of Weymouth Conservation Agent prior to the installation of erosion controls and environmental protections. Refer to Appendix D.
- b. Erosion control lines shall be laid out as indicated on the drawings and shall establish the limits of work within the municipal sewer easement.
- c. Topographic survey points shall be taken to record the preconstruction location and elevation of the top of coastal bank within the limits of work as well as where it is present within ten feet of the river side of the limit of work. The post-construction topographic survey shall locate these coastal bank locations to compare to preconstruction locations and elevations. Refer to Appendix D.

C. Access:

- 1. Obtain the necessary permission from the property owners or tenants as may be required for entry onto private property.
- 2. If unable, after repeated reasonable attempts, to obtain permission from owners or tenants to enter the properties, immediately notify the Engineer.

1.5 QUALITY ASSURANCE

A. Qualifications:

- 1. Inspection party shall be under the supervision of a Massachusetts Professional Engineer, Licensed Construction Superintendent, or Licensed Building Inspector.

2. Certified field survey shall be under the supervision of a Massachusetts Registered Land Surveyor.
3. The Registered Professional Engineer, Licensed Construction Superintendent, or Licensed Building Inspector shall, during the last five years, have been in the business of structural evaluation of buildings and structures for construction projects of similar scope and dollar value.
4. The Contractor shall provide survey work by a firm having successfully completed at least five projects of similar size and complexity within the last five years, and who shall employ experienced personnel and provide adequate supervision to satisfaction of the Engineer at all times when operations are in progress.
5. The company engaged for professional photography and videography shall, during the last five years been in the business of photography and videotaping of construction projects of similar scope and dollar value.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use new materials in restoration of existing facilities except where soil materials and plants may be reused as appropriate, and as approved by the Engineer.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Buildings:
 1. An inspection party under the supervision of a Massachusetts Registered Professional Engineer, Licensed Construction Superintendent, or Licensed Building Inspector shall make a detailed examination of the interior and exterior of the buildings.
 2. Detailed examination of all structures within 100 feet of the limit of work shall include an interior and exterior visual survey of the property, buildings, on-site improvements and plantings, color photographs of interior and exterior showing visually evident structural faults, and including but not limited to: locations and sizes of cracks in floors, ceilings, and exterior and interior walls, especially instances of cracked or missing plaster; damaged masonry or roofing; damaged windows and doorways; walls which are not vertical or floors that are not horizontal; damage to foundations; including interior and exterior basement walls; and tightness of fit of doors and windows in their respective jambs.

3. Interview owners and tenants of properties regarding existing conditions and structural faults, and determine dates and extent of recent repairs.
4. Color photographs shall be taken as required to indicate structure conditions.
5. The work shall also include a certified field survey of properties where the Lower Central Interceptor easement is located to determine elevations of existing buildings and structures in conjunction with the preconstruction survey and layout. The work shall be performed by a Registered Land Surveyor. The certified field survey shall meet the minimum requirements:
 - a. Corners of building or structure foundation in both the front and rear of building or structure.
 - b. Intermediate points within the limits stated above, including doorways, construction and expansion joints, and other features as appropriate.
 - c. The location of each elevation shall be fully described in words and located on a plan.

B. Utilities:

1. Before starting operations, examine site to become acquainted with conditions to be encountered.
2. The survey shall include all rim elevations and conduit and structure inverts. Verify exact locations of sewers, water mains, gas mains, above or below ground electrical wires, other utilities, conduits and structures which may interfere with work.
3. Verify and stake-out exact locations of the proposed work.

C. The Contractor may elect to perform preconstruction surveys on buildings not included in paragraph 3.1.A.2 above. Such surveys will be done at no additional cost to the Owner.

D. The Contractor shall make videotape recordings of all features within the proposed construction limits of work in digital format prior to construction to document the areas for restoration.

E. The Contractor shall report immediately to the Engineer any finding that, in their opinion, may indicate that the required construction will adversely affect any building or structure. Excavation and support of excavation operations shall not proceed until written instruction is received from the Engineer.

3.2 APPLICATION

- A. Site Layout: Prior to any construction activities at the site, the Contractor shall establish control points and coordinate this work with the Engineer. The Contractor shall use the information on the Drawings, where available, and shall supplement this with any necessary file searches to provide the necessary information to perform a complete line survey around the entire limits of the work area. The Contractor shall also establish permanent vertical benchmarks within the limit of work in locations approved by the Engineer.
- B. Connections to Existing Facilities:
 - 1. Make connections to existing facilities as indicated on drawings or as specified.
 - 2. Obtain permission from specific utility owners in writing prior to undertaking connections.
 - a. Protect facilities against deleterious substances and damage.
 - 3. Plan in advance all connections to existing facilities which are in service.
 - a. All equipment, materials, and labor shall be on hand at time of undertaking connections to existing facilities in service.
 - b. Work shall proceed continuously if necessary to complete connections within the time designated by the Engineer.
- C. Restoration and Protection of Public and Private Property:
 - 1. Protect, shore, brace, support, and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by construction operations.
 - 2. Restore all public and private property including pavement, surfacing, curbs, walks, utility poles, guy wires, fences, docks, and other surface structures affected by construction operations, together with all loam and seed and landscaping to their original condition or better, whether within or outside easements.

3.3 CONTRACT CLOSEOUT

- A. Provide in accordance with Section 01700 - Contract Closeout.

END OF SECTION 01050

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SECTION 01063

MISCELLANEOUS REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 and 2 Specification Sections, apply to this section.

1.2 SUMMARY

- A. The Contractor shall conform to all miscellaneous requirements as specified herein.

1.3 TRAFFIC CONTROL

- A. For control of moderate traffic, the Contractor shall provide an adequate number of traffic control devices employed at his own expense.
- B. Whenever and wherever traffic is sufficiently congested, public safety is endangered, or as required by authorities having jurisdiction, the Owner shall provide uniformed police officers to direct traffic and to keep traffic off the area affected by construction operations. Such officers shall be in addition to the traffic control requirements specified in other provisions of the contract. The Owner shall be responsible for the costs and coordination of all police details.
- C. The employment or presence of traffic flagmen, special officers, or police shall in no way relieve the Contractor of any responsibility or liability which is his under the terms of the contract.

1.4 INTERFERENCE WITH EXISTING WORKS

- A. The Contractor shall at all times conduct his operations so as to interfere as little as possible with existing works. The Contractor shall develop a program, in cooperation with the Engineer and interested officials, which shall provide for the construction and putting into service of the new works in the most orderly manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted. All work of connecting with, cutting into, and reconstructing existing pipes or structures shall be planned to interfere with the operation of the existing facilities for the shortest possible time when the demands on the facilities best permit such interference, even though it may be necessary to work outside of normal working hours to meet these requirements. Before starting work which will interfere with the operation of existing facilities, the Contractor shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand. The Contractor shall make such minor modifications in the work relating to existing structures as may be necessary, without additional compensation.

- B. The Contractor shall have no claim for additional compensation by reason of delay or inconvenience in adapting his operations to meet the above requirements.
- C. The Contractor shall have no claim for additional compensation by reason of delay or inconvenience in adapting his operations to the need for continuous flow of sewage.

1.5 MAINTAINING FLOWS

- A. It is essential to the operation of the existing sewerage system that there is no interruption in the flow of sewage. To this end, the Contractor shall at his own expense, provide, maintain, and operate all temporary facilities such as dams, pumping equipment, conduits, and all other labor and equipment necessary to intercept the sewage flow before it reaches the points where it would interfere with his work, carry it past his work, and return it to the existing sewer below his work. Refer to Section 02538.
- B. The Contractor shall at his own cost, provide for the flow of sewers, drains and water courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow.
- C. Outside of the Pipe Jacking which shall operate continuously, construction shall be limited to the hours between 7 A.M. and 7 P.M. Monday through Friday excluding all public holidays. Minimum sewage flow occurs during the night hours and the Contractor may work on the existing sewer at such times on a conditional basis if approved in writing by the Owner and Engineer. Contractor shall request approval in writing to work outside of specified construction hours at least 72 hours in advance.

1.6 HYDRAULIC UPLIFT OF STRUCTURES

- A. The Contractor shall be responsible for the protection of all structures against hydraulic uplift until such structures have been accepted finally by the Owner. Buoyancy calculations shall assume water elevation at the 100-year flood plain elevation.

1.7 SAFETY PRECAUTIONS

- A. The Contractor's attention is directed to the potential hazards involved in performing work on the sewer system due to the presence of sewer gasses which can become explosive when mixed with air. The Contractor shall be responsible for the utilization of thorough and adequate safety precautions to prevent injury to persons and facilities involved in the work.

1.8 BURIED UTILITY WARNING AND IDENTIFICATION TAPE

- A. Provide detectable aluminum foil plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried piping. Tape

shall be detectable by an electronic detection instrument. Provide tape in rolls, 3 inches minimum width, color coded for the utility involved with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification shall be CAUTION BURIED SEWER PIPING BELOW or similar. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material. Bury tape with the printed side up at a maximum depth of 12 inches below the top surface of earth or the top surface of the subgrade under pavements.

1.9 WATERTIGHTNESS

- A. All structures, pipes, and equipment which are to contain water shall be watertight under all operating conditions for which they are intended. The Contractor shall furnish all labor, materials and equipment and do all work required by the Engineer to make all such parts of the work watertight, or to replace them if in the opinion of the Engineer any leakage is excessive. All such parts of the work filled with water for testing watertightness shall be left filled as ordered by the Engineer.

1.10 CARE OF WATERCOURSES

- A. The Contractor shall maintain the flow in all watercourses, whether open channels or in pipes, in all sewers and other pipes interfered with in the line of work and convey the flow to a suitable point of discharge so as not to flow upon the work or create a nuisance. In the discharge of water removed from the excavations by pumping or by gravity similar precautions shall be observed. Fire hydrants on or adjacent to the work shall be kept operational and accessible to fire-fighting equipment at all times.

1.11 WORK HOURS AND SITE ACCESS

- A. Construction shall be limited to the hours between 7:00 a.m. and 7:00 p.m., Monday through Friday with the exception of observed holidays. Requests to work outside of the established work hours shall be submitted in writing to the Engineer at least 72-hours in advance.
- B. Deliveries shall be restricted to the hours between 7:00 a.m. and 7:00 p.m.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01063

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SECTION 01080

ABBREVIATIONS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 RELATED SECTIONS

- A. Section 01090: Reference Standards

1.3 ABBREVIATIONS

- A. Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth opposite each. Abbreviations for trade associations and standards organizations are listed in section 01090 - Reference Standards.

AASHTO American Association of State Highway and Transportation Officials

ACI American Concrete Institute

ACOE Army Corps of Engineers

AISC American Institute of Steel Construction

ANSI American National Standards Institute

ASCE American Society of Civil Engineers

ASTM American Society for Testing and Materials

AWWA American Water Works Association

Fed. Spec. Federal Specifications issued by the Federal Supply Service of the
General Services Administration, Washington, D. C.

125-lb. ANSI American National Standard Institute for Cast-iron 250-lb. ANSI
or Pipe Flanges and Flanged Fittings, Designation B16.1, for the
250 lb. ANSI Appropriate class

AWG American or Brown and Sharpe Wire Gage

NPT National Pipe Thread

OS&Y	Outside screw and yoke
Stl. WG	U. S. Steel Wire, Washburn and Moen, American Steel and Wire or Roebbling Gage
USS Gage	United States Standard Gage
WOG	Water, Oil, Gas
WSP	Working steam pressure
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
IEEE	Institute of Electrical and Electronics Engineers, Inc.
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood-Preservers' Association
AWWA	American Water Works Association
CS	Commercial Standard
IBR	Institute of Boiler and Radiator Manufacturers

IPS	Iron Pipe Size
JIC	Joint Industry Conference Standards
NBS	National Bureau of Standards
NEC	National Electrical Code; latest edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
UL	Underwriters' Laboratories

1.4 DEFINITIONS

- A. Wherever the words defined in this section or pronouns used in their stead occur in the Contract Documents, they shall have the meanings herein given.
- B. General: Basic Contract definitions are included in the Conditions of the Contract.
- C. Indicated: The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.
- D. Directed: Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Engineer, requested by the Engineer, and similar phrases.
- E. Approve: The term approved, when used in conjunction, with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- F. Regulation: The term regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- G. Furnish: The term furnish means supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- H. Install: The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

- I. Provide: The term provide means to furnish and install, complete and ready for the intended use.
 - 1. The term experienced, when used with the term Installer means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
 - 2. Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
- J. Project Site is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. Testing Agencies: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- L. Elevation: The figures given on the Drawings or in the other Contract Documents after the word "elevation" or abbreviation of it shall mean the distance in feet above the datum adopted by the Engineer.
- M. Rock: The word "rock," wherever used as the name of an excavated material or material to be excavated, shall mean only boulders exceeding 1 cu. yd. in volume, or solid ledge rock which, in the opinion of the Engineer, requires, for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power-operated tool.
- N. Earth: The word "earth", wherever used as the name of an excavated material or material to be excavated, shall mean all kinds of material other than rock as above defined.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01080

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SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 QUALITY ASSURANCE

- A. Should specified reference standards conflict with the Contract Documents, refer to Article 3 of the General Conditions.

1.3 INDUSTRY STANDARDS (SCHEDULE OF REFERENCES)

- A. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

- 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

- B. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed, but not assured, to be accurate and up to date as of the date of Contract Documents.

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006
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AABC	Associated Air Balance Council 1000 Vermont Avenue, N.W. Washington, DC 20005
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AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001
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ACI	American Concrete Institute Box 19150, Reford Station Detroit, MI 48219
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ADC	Air Diffusion Council 230 North Michigan Avenue Chicago, IL 60601
AFBMA	Antifriction Bearing Manufacturers Association 1101 Connecticut Avenue, N.W., Suite 700 Washington, DC 20036
AGA	American Gas Association
AGC	Associated General Contractors of America 1957 E Street, N.W. Washington, DC 20006
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AIA	American Institute of Architects 1735 New York Avenue, N.W. Washington, DC 20006
AISC	American Institute of Steel Construction Eighth Floor 400 North Michigan Avenue 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 1430 Broadway New York, NY 10018
APA	American Plywood Association Box 11700 Tacoma, WA 98411

API	American Petroleum Institute 1220 L. Street, N.W. Washington, DC 2005
ARI	Air-Conditioning and Refrigeration Institute 1501 Wilson Boulevard Arlington, VA 22209
ASCE	American Society of Civil Engineers 345 E. 47th Street New York, NY 10017
ASHRAE	American Society of Heating, Refrigeration 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 4415 West Harrison Street Hillside, IL 60162
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 7735 Old Georgetown Road Bethesda, MD 20014
AWS	American Welding Society 550 LeJeune Road, N.W. Miami, FL 33135
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
BIA	Brick Institute of America 11490 Commerce Park Drive Reston, VA 22091

CDA	Copper Development Association 57th Floor, Chrysler Building 405 Lexington Avenue New York, NY 10174
CLFMI	Chain Link Fence Manufacturers Institute 1101 Connecticut Avenue, N.W. Washington, DC 20036
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60195
DHI	Door and Hardware Institute 7711 Old Springhouse Road McLean, VA 22101
EJCDC	Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1015 15th Street, N.W. Washington, DC 20005
EJMA	Expansion Joint Manufacturers Association 25 North Broadway Tarrytown, NY 10591
FGMA	Flat Glass Marketing Association 3310 Harrison White Lakes Professional Building Topeka, KS 66611
FM	Factory Mutual System 1151 Boston-Providence Turnpike P.O. Box 688 Norwood, MA 02062
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WRSIS) Washington Navy Yard, Building 197 Washington, DC 20407
GA	Gypsum Association 1603 Orrington Avenue Evanston, IL 60201

JIC	Joint Industrial Council c/o National Machine Tool Builders Association 79-1 Westpark Drive McLean, VA 22102
IBR	Institute of Boiler and Radiator Manufacturers a/k/a Hydronics Institute P.O. Box 218 35 Russo Place Berkeley Heights, NJ 07922
ICBO	International Conference of Building Officials 5360 S. Workman Mill Road Whittier, CA 90601
IEEE	Institute of Electrical and Electronic Engineers 345 East 47th Street New York, NY 10017
IMIAC	International Masonry Industry All-Weather Council International Masonry Institute 815 15th Street, N.W. Washington, DC 20005
MBMA	Metal Buildings Manufacturer's Association 1230 Keith Building Cleveland, OH 44115
MIL	Military Specifications Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
ML/SFA	Metal Lath/Steel Framing Association 221 North LaSalle Street Chicago, IL 60601
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry 127 Park Street, NE Vienna, VA 22180
NAAMM	National Association of Architectural Metal Manufacturers 221 North LaSalle Street Chicago, IL 60601

NAPA	National Asphalt Pavement Association 6811 Kenilworth Avenue Calvert Building, Suite 620 Riverdale, MD 207307
NCMA	National Concrete Masonry Association P.O. Box 781 Hendron, VA 22070
NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180
NEC	National Electric Code
NEMA	National Electrical Manufacturers' Association 2101 'L' Street, N.W. Washington, DC 20037
NFPA	National Fire Protection Association Battery March Park Quincy, MA 02269
NFPA	National Forest Products Association 1619 Massachusetts Avenue, N.W. Washington, Dc 20036
NSWMA	National Solid Wastes Management Association 1730 Rhode Island Avenue, N.W. Washington, DC 20036
NTMA	National Woodwork Manufacturers Association 205 W. Touhy Avenue Park Ridge, IL 60068
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077
PCI	Prestressed Concrete Institute 201 North Wells Street Chicago, IL 60606
PS	Product Standard U.S. Department of Commerce Washington, DC 20203

RIS	Redwood Inspection Service One Lombard Street San Francisco, CA 94111
RCSHSB	Red Cedar Shingle and Handsplit Shake Bureau 515 116th Avenue Bellevue, WA 98004
SDI	Steel Deck Institute P.O. Box 9506 Canton, OH 44711
SDI	Steel Door Institute 712 Lakewood Center North 14600 Detroit Avenue Cleveland, OH 44107
SIGMA	Sealed Insulating Glass Manufacturers Association 111 East Wacker Drive Chicago, IL 60601
UL	Underwriters Laboratories Inc. 333 Pfingsten Road Northbrook, IL 60062-2096
WSC	Water Systems Council 600 S. Federal Street, Suite 400 Chicago, IL 60605

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01090

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SECTION 01110

ENVIRONMENTAL PROTECTION MEASURES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work covered by this Section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.
- B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.
- C. The Contractor shall take sufficient precautions during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens and calcium chloride into the wetland resource areas and surface water bodies located within or adjacent to the limits of work.
- D. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked coir logs, hay bales, seeding, mulching or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.
- E. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a wetland resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.
- F. All phases of sedimentation and erosion control shall comply with and be subject to the approval of the Town of Weymouth Conservation Commission.
- G. Contractor shall review the project's local, state, and federal regulatory approvals that are provided in Appendices D, E, and G of the Contract Specifications. The conditions of these regulatory approvals are considered to be part of the Contract Documents.
- H. The limits of work within wetland resource areas is shown on the Contract Drawings.

- I. Contractor shall submit a Construction Period Stormwater Pollution Prevention Plan (SWPPP) for review and approval of the Engineer and Conservation Commission. SWPPP shall be project specific and support filing of Notice of Intent for NPDES Construction General Permit coverage.
- J. The Department of Marine Fisheries special concern is rainbow smelt.

1.2 RELATED SECTIONS

- A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - 1. Section 02020 – Erosion and Sediment Control
 - 2. Section 02200 – Earthwork
 - 3. Section 02273 – Geotextile Fabric
 - 4. Section 02950 – Planting

1.3 APPLICABLE REGULATIONS

- A. Comply with all applicable Federal, State and local laws, regulations, and regulatory approvals concerning construction activities within wetland resource areas. Refer to Appendices D and G of the Contract Specifications.

1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 and as specified herein:
 - 1. Product data and drawings for the construction mats.
 - 2. Qualifications for proposed Wetland Scientist.
 - 3. Construction Period Stormwater Pollution Prevention Plan
 - 4. Copy of Notice of Intent and supporting documentation for coverage under the National Pollutant Discharge Elimination System (NPDES) 2022 Construction General Permit submitted to the United States Environmental Protection Agency.

1.5 NOTIFICATIONS

- A. The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain

aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance with State or local requirements. The Contractor shall, after receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his/her authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

- B. The Contractor shall notify the Weymouth Conservation Administrator, (781) 340-5007, at least 48 hours prior to start of any work.

1.6 MEETINGS

- A. Following layout of the erosion control line(s), the Contractor shall meet with the Engineer and Conservation Administrator to review the location of the proposed erosion control line(s) prior to installation. Contractor shall make any necessary revisions to the erosion control layout and proceed with installation.
- B. Following installation of the erosion control line(s) and environmental protection measures, the Contractor shall meet with the Owner, Engineer, and Conservation Administrator to review the installation and the Order of Conditions (Appendix D) issued for this project.
- C. Prior to commencement of the work, the Contractor and their wetland scientist shall meet with the Engineer and Conservation Administrator to review compliance with the Order of Conditions and other wetlands and waterways regulatory approvals for construction within wetland resource areas.

1.7 WETLAND SCIENTIST

- A. The Contractor shall retain the services of a professional wetland scientist for compliance with the various local, state, and federal regulatory approvals for construction within wetland resource areas.
- B. The Contractor's wetland scientist must have worked on at least two projects in the past five years similar in scope and dollar value to this project. The wetland scientist shall be experienced with construction projects within coastal areas and wetland resource areas as well as erosion and sediment control, soil stabilization, and wetland restoration.
- C. The Contractor shall submit the wetland scientist's qualifications to the Engineer and Owner for review and approval prior to the start of construction. The Engineer shall provide the qualifications to the Conservation Administrator for review and comment.

- D. The Contractor's wetland scientist shall submit monthly project reports to the Engineer during active construction work in the wetland resource areas.
- E. The Contractor shall provide the contact information for their Wetland Scientist to the Engineer and Conservation Administrator prior to the start of construction.

PART 2 - PRODUCTS

2.1 CONSTRUCTION MATS

- A. Construction mats shall distribute the weight of heavy equipment to minimize damage to the wetland resource areas while facilitating passage of, and provide a working surface for, workers and equipment.
- B. Mats shall be constructed from timber or plastic materials and shall be easily assembled and secured. Composite mats shall be GeoTerra® by Presto Geo Systems or approved equal. Timber mats shall be manufactured by Beaseley Forest Products or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install silt fence, coir logs, and coir mats in accordance with manufacturer's printed instructions.
- B. Overlap silt fence 18 inches minimum for unsewn lap joint. Overlap fabric 6 inches at seam for sewn joint.
- C. Install sedimentation barriers in all locations as directed, surrounding base of all deposits of stored excavated material outside of disturbed area, and where directed by the Engineer.
- D. Stake coir logs in place with two 2 in. by 2 in. by 3 ft. stakes so that each log is butted tightly against ad-joining log thereby precluding short-circuiting of coir logs.
- E. Construct earth berms or diversions to intercept and divert runoff water from critical areas.
- F. Protect catch basins and drainage swales from sedimentation by installing hay bales around the basin or swale or siltation fabric under catch basin grating casting.
- G. Do not place excavated soil material adjacent to water-course in manner that will cause it to wash away by high water or runoff.
- H. Prevent damage to vegetation by excessive watering or silt accumulation in the discharge area.

- I. Do not dump spoiled material into any streams, wetlands, surface waters, or unspecified locations.
- J. Prevent indiscriminate, arbitrary, or capricious operation of equipment in streams, wetlands or surface waters.
- K. Prevent damage to vegetation adjacent to or outside of construction area limits.
- L. Do not dispose of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in streams, wetlands, surface waters, or natural or man-made channels leading thereto, or unspecified locations.
- M. Do not alter flow line of any stream unless indicated or specified.
- N. Erosion and sedimentation controls shall be inspected daily. Repairs and replacement of any damaged controls shall be made as needed to assure proper functioning.
- O. Clean and dispose of debris from sedimentation barriers on a weekly basis.
- P. The top one foot of wetland soils shall be excavated from within the limits of the utility trench and shall be stored in a secure location on-site while the work is performed. These soils shall be used as backfill within the top one foot of the trench from the same area and ecotype (i.e. coastal beach, bordering vegetated wetland, upland) that it was removed from. Backfilling with non-native materials in the top one foot of the trench will be limited only to those areas infested with common reed (*Phragmites australis*). Refer to Sections 02200, 02950 and Appendix D.
- Q. Contractor shall remove the top one foot of soils from areas infested with common reed (*Phragmites australis*) as indicated by the Engineer and Conservation Administrator. These soils shall be removed and disposed of off-site at a licensed disposal facility.
- R. The Contractor shall temporarily remove any salt marsh vegetation subject to disturbance within the limits of work including the top 1 foot of underlying soils and set it aside on top of geotextile fabric so that it may be reinstalled in the same location as part of restoration activities for that specific area. Contractor shall review areas subject to this condition with the Engineer and Conservation Commission prior to commencing work in these areas.
- S. Upon completion of work and upon approval of Conservation Commission and Engineer, remove and dispose of silt fence.
- T. Excess construction mats shall not be stored in wetland resource areas.
- U. Access routes to sewer structures along or within wetland resource areas shall be as indicated on the plans. No increase in temporary impacts or alternate access routes will be allowed without prior approval from the Conservation Commission and MADEP.

- V. Construction mats shall be lifted and lowered into place. Dragging of mats will be prohibited.
- W. Contractor shall use only low ground pressure equipment (less than 3 psi) within wetland resource areas in which construction mats are not suitable.
- X. All trenches shall be properly backfilled and temporarily stabilized at the end of the work day or prior to the next high tide.
- Y. Upon completion of sewer construction activities, the Contractor shall stabilize and restore all wetland resource areas temporarily impacted by construction activities. Stabilization and wetland replication requirements are provided in Section 02020, Section 02950, and Appendix D of the Contract Specifications.
- Z. A copy of the Order of Conditions and Water Quality Certificate shall be kept on-site throughout construction.
- AA. The Contractor shall always maintain oil and hazardous material spill prevention and response equipment on-site.

3.2 DEWATERING

- A. Refer to Section 02140 for additional requirements.
- B. Discharge silt-laden water from excavations onto filter fabric mat and/or baled hay or straw sediment traps to ensure that only sediment-free water is returned to watercourses.
- C. Do not pump silt-laden water from trenches or excavations directly into surface waters, streams, wetlands, or natural or man-made channels leading thereto.

3.3 PROVISIONS FOR CONTROL OF EROSION

- A. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion. Erosion control measures, such as siltation basins, hay/coir check dams, mulching, coir netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented.
- B. Disposal of drainage shall be in an area approved by the Owner. The Contractor shall prevent the flow or seepage of drainage back into the drainage area. Drainage shall not be disposed of until silt and other sedimentary materials have been removed. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.
- C. As a minimum, the following shall apply:
 - 1. Silt fence and coir logs shall be provided at points where drainage from the work site may contain polluting substances. The point of control shall be

within the limits of construction and shall be contained in such a way as to not allow sediment to pass. Sufficient sediment controls shall be provided such that all flow will filter through the controls. Other methods which reduce the sediment content to an equal or greater degree may be used as approved by the Engineer.

2. Drainage leaving the site shall flow to water courses in such a manner to prevent erosion.
- D. Measures for control of erosion must be adequate to assure that turbidity in the receiving water will not be degraded. Discharges from construction dewatering systems shall comply with the Massachusetts Surface Water Quality Standards and the Construction General Permit.
 - E. An adequate stockpile of erosion control materials shall be on-site at all times for emergency or routine replacement.

3.4 PROTECTION OF SURFACE WATER BODIES

- A. Care shall be taken to prevent, or reduce to a minimum, any damage to any surface water from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Such waters will be diverted through a settling basin or filter before being directed into the streams.
- B. The Contractor shall not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels. Refer to Section 02140 for additional requirements.
- C. All preventative measures shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Massachusetts Department of Environmental Protection.
- D. Water being flushed from structures or pipelines after disinfection, with a Cl_2 residue of 2 mg/l or greater, shall be treated with a dechlorination solution, in a method approved by the Engineer, prior to discharge.
- E. Water used to rinse concrete trucks or other equipment shall not be discharged to the wetland resource area, municipal storm sewer, or sanitary sewer.

3.5 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.
- B. Outside of areas requiring earthwork for the construction of the new facilities, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment, dumping or other operations, protect such trees by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly before beginning operations near them.
- D. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition. 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.
- E. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.
- F. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed or replaced.
- G. Stumps shall be left in place to avoid creating erosion or bank stability concerns with the exception of any stumps that require removal to protect the integrity of the sewer or other underground utilities within the existing sewer easement. Contractor shall coordinate stump removal with Engineer.
- H. The locations of the Contractor's storage, and other construction buildings, required temporarily in the performance of the work, shall be cleared portions of the job site or areas to be cleared as shown on the Drawings and shall require written approval of the Engineer and shall not be within wetlands or below the high tide line. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the Engineer.

- I. If the Contractor proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he/she shall submit the following for approval at least ten days prior to scheduled start of such temporary work.
 - 1. A layout of all temporary roads, excavations and embankments to be constructed within the work area.
 - 2. Details of temporary road construction.
 - 3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.
 - 4. A landscaping drawing showing the proposed restoration of the area. Removal of any trees and shrubs outside the limits of existing clearing area shall be indicated. The drawing shall also indicate location of required guard posts or barriers required to control vehicular traffic passing close to trees and shrubs to be maintained undamaged. The drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the Contractor's approved drawings shall be made only with the written approval of the Engineer. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.
- J. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or any other vestiges of construction as directed by the Engineer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be prepared and seeded as approved by the Engineer.
- K. All debris and excess material will be disposed of outside wetland or floodplain areas in an environmentally sound manner.

3.6 PROTECTION OF AIR QUALITY

- A. Burning. The use of burning at the project site for the disposal of refuse and debris will not be permitted.
- B. Dust Control. The Contractor will be required to maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.
- C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with approval from the Engineer.

- D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the Engineer.

3.7 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. During the life of this Contract, maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.
- B. Remove temporary environmental control features, when approved by the Engineer, and incorporate permanent control features into the project at the earliest practicable time.
- C. Secondary containment shall be provided for all pumps used on the project (e.g. dewatering and sewer bypass). Fuel for pumps shall not be stored within the sewer easement.
- D. Maintenance, storage, and repair of construction equipment shall not be permitted within the limits of wetland resource areas (excluding riverfront area). Contractor shall remove equipment to the temporary staging area or off-site for all maintenance, storage, and repair.
- E. Equipment refueling with the exception of pumping systems shall not be permitted within 100 feet of wetland resource areas (excluding riverfront area) or surface water bodies.

3.8 NOISE CONTROL

- A. The Contractor shall make every effort to minimize noises caused by his/her operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with State and Federal regulations as well as Local ordinances.
- B. Contractor should note local residences within proximately of the work and shall make all efforts to minimize noise disruptions.

3.9 RAINBOW SMELT PROTECTION

- A. A time-of-year (TOY) restriction shall be observed from March 1 – June 30 on all activities that may produce noise and/or vibration to protect sensitive life stages of rainbow smelt within the Tide Mill Brook.

3.10 CONTRACT CLOSEOUT

A. Provide in accordance with Section 01700.

END OF SECTION 01110

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SECTION 01170

SPECIAL PROVISIONS

PART 1 - GENERAL

1.1 GENERAL OBLIGATIONS OF THE CONTRACTOR

- A. General obligations of the Contractor shall be as set forth in the Contract Documents. Unless special payment is specifically provided in the payment paragraphs of the specifications, all incidental work and expense in connection with the completion of work under the Contract will be considered a subsidiary obligation of the Contractor and all such costs shall be included in the appropriate items in the Bid Form in connection with which the costs are incurred.

1.2 SITE INVESTIGATION

- A. The Contractor shall satisfy himself/herself as to the conditions existing within the project area, the type of equipment required to perform the work, the character, quality and quantity of the subsurface materials to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the Drawings and Specifications. Any failure of the Contractor to acquaint himself/herself with the available information will not relieve him/her from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any conclusions or interpretation made by the Contractor on the basis of the information made available by the Owner.

1.3 CONTRACTOR'S EMERGENCY CONTACT AND RESPONSE REQUIREMENT

- A. The Contractor will be required to designate a contact person as well as an emergency response crew who can be notified by the Town of Weymouth and the Engineer during Contract related emergencies, 7 days a week, 24 hours a day throughout the length of this Contract.
- B. The name of the designated person, a daytime contact telephone number, an evening contact telephone number, and a portable cellular telephone number must be furnished to the Town of Weymouth at the pre-construction meeting. The Contractor must also provide a mobile cellular telephone that will remain at the construction site during the hours of construction.
- C. The contact person shall be required to respond to any Town of Weymouth notification in this regard within one hour of such notice by calling (781)-337-5100 during normal working hours or (781) 335-1212 after hours. Upon being advised by the Town of Weymouth of the location and nature of the emergency, the Contractor will be required to provide an emergency coordinator or contact at the site within one hour of the initial notification and to mobilize the necessary response crew(s) and have them at the site of the emergency within two hours of the initial notification.

- D. The Contractor's failure to comply with the above notification and response requirements shall result in a one thousand dollar (\$1,000.00) fine for each failure to respond as indicted in 1.4.C. In addition the Contractor shall be liable for any and all damages, liabilities and costs which result from his/her failure to respond to any emergency within the designated time periods. The Town of Weymouth assumes no responsibility or costs for the Contractor's negligence in complying with these requirements. If the subject fine or other liabilities are not paid by the Contractor upon request, it shall be deducted from any payment(s) which may be due the Contractor by the Town of Weymouth, solely at the discretion of the Town of Weymouth.
- E. The Contractor shall not use any Town of Weymouth personnel to fulfill these requirements.
- F. This requirement shall be considered an incidental part of the Contract, no matter how many times the Contractor is alerted during this Contract, and no payment will be made for any costs incurred or associated with the emergency contact and response requirements.
- G. In the event of a malfunction or break in the sewer main or sewer bypass piping and appurtenances during construction that results in a discharge of sewage to the environment, the Contractor shall notify the Town of Weymouth immediately.

1.4 PUBLIC UTILITIES

- A. The Contractor shall comply with the requirements of the Commonwealth of Massachusetts Statute - Chapter 82A, for excavations in public and private property. Compliance shall include the following:
 - 1. The Contractor shall notify public utility companies in writing at least 72 hours (excluding Saturdays, Sundays and legal holidays) but not more than 30 days before excavating in areas where underground utility plant (pipes, cables, manholes, etc) exist.
 - 2. The Contractor shall be responsible for providing the Utility Companies with a schedule of his/her activities in areas where the utilities exist.
 - 3. The Contractor shall immediately notify utility companies of any damage to their utilities resulting from construction operations.
 - 4. The express approval of the Owner shall be obtained before public water is used. Hydrants shall only be operated under the supervision of the Owner's personnel. The water is to be metered. A meter must be attained from the Water Department. The Contractor will be responsible for all associated fees and charges for water use.

- B. The Contractor shall notify DIGSAFE at 1-800-344-7233 at least 72 hours before digging, trenching, blasting, demolishing, boring, backfilling, grading, landscaping or other earth moving operations in any public ways, rights of way and easements.

1.5 PERMITS

- A. The Contractor shall be required to obtain all necessary permits for proper execution of certain phases of the project. The Contractor shall fill out all forms and furnish all drawings required to obtain the permits. A copy of the approved permit shall be submitted to the Engineer. All fees associated with these permits shall be paid by the Contractor as part of the project. Work shall not commence on any phase of the work requiring a permit until the permit is obtained.
- B. Permit coordination shall include, but will not be limited to, the following: Massachusetts Bay Transportation Authority (MBTA), Massachusetts Department of Environmental Protection (MADEP) Bureau of Resource Protection, and Environmental Protection Agency (EPA).
- C. For all work performed within the Massachusetts Bay Transportation Authority (MBTA) right-of-way (ROW) or 30-foot Zone of Influence (ZOI), the Contractor shall comply with all requirements described in the MBTA License Agreement. The work shall include but not limited to providing MBTA with a Certificate of Liability Insurance, Support of Excavation Plan for the access pits, Job Hazard Analysis for pipe pressure testing activity, and Project Work Plan. The Contractor shall also be responsible for payment of license fees and all invoices submitted by the MBTA as stipulated in the license agreement, geotechnical monitoring in accordance with MBTA requirements, performing a boundary survey of the MBTA ROW and ZOI within the project area, having all workers complete Keolis Roadway Work Protection training, and meeting with MBTA prior to performing work. Appendix I contains draft license conditions received from the MBTA prior to bidding, sample license agreement language, applicable MBTA Operations Directives, and MBTA trenching policies. If the license agreement is not provided during the bidding process via addendum, and the final license agreement contains requirements above and beyond the requirements outlined in the plans and specifications, the Contractor shall be entitled to additional compensation to complete the work in accordance with MBTA requirements. In parallel with the License Agreement execution by the Contractor, the Town of Weymouth will execute an easement with the MBTA and pay all easement costs (appraisal, administrative fee, easement value).

1.6 TRAFFIC AT STREET INTERSECTIONS

- A. The Contractor shall minimize interferences with the normal flow of traffic. The Contractor shall take all actions ordered by the Engineer to minimize the disruption of normal traffic flow.
- B. The Contractor shall note proximity to local residential area and all efforts to minimize traffic disruptions shall be provided.

1.7 SAVANNAH DRIVE SUBDIVISION

- A. The Contractor will install a sewer manhole for connection of the Savannah Drive sewer by Ryder Development Corporation (RDC) to SMH-5D by December 1, 2025.
- B. Upon connection of the Savannah Drive sewer, the Contractor will assume maintenance of Savannah Drive sewage flow until substantial completion of the LCI Replacement Project. Sewer flow from Savannah Drive will be generated from a maximum of 7 residential dwellings.
- C. Maintenance of sewage flow on Savannah Drive, upstream of the sewer manhole connection provided by the Contractor, will remain the responsibility of RDC.
- D. Use of Savannah Drive Lots 5, 6, and 7 as a construction staging area will cease within 14 calendar days of issuance of a certificate of substantial completion of the LCI replacement project.
- E. The Contractor shall coordinate activities with RDC. RDC will actively be constructing residential homes and installing utilities in Savannah Drive during the LCI Improvements project.
- F. The Contractor may not utilize Edison Drive as an access point to Savannah Drive. Construction access will be limited to Narragansett Avenue.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01170

SECTION 01200
PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 COORDINATION WITH THE TOWN

- A. As part of this Contract, the Contractor shall coordinate his activities with the Town. In addition, the Contractor will give the Town significant notice on any work that may be required to meet the contract schedule.

1.3 PRECONSTRUCTION CONFERENCE

- A. A pre-construction conference will be held between the Contractor, the Engineer, the Owner, and applicable agency representatives to review the Contractor's proposed methods of complying with the requirements of the Contract Documents.
- B. Contractor will be notified of the time, date and place where the pre-construction conference will be held.

1.4 PROGRESS MEETINGS WITH ENGINEER

- A. In addition to other regular project meetings for other purposes (as indicated elsewhere in the Contract Documents), hold general progress meetings twice each month with times coordinated with preparation of payment requests. Meeting dates shall be established by the Engineer. Require every entity then involved in the planning, coordination or performance of work to be properly represented at each meeting. Include (when applicable) consultants, separate contractors (if any), principal subcontractors, suppliers/ manufacturers/fabricators, governing authorities, insurers, special supervisory personnel and others with an interest or expertise in the progress of the work. Review each entity's present and future needs including interface requirements, time, sequence, deliveries, access, site utilization, temporary facilities and services, hours of work, hazards and risks, housekeeping, submittals, change orders, and documentation of information for payment requests. Discuss whether each element of current work is ahead of schedule. Determine how behind-time work will be expedited, and secure commitments from the entities involved in doing so. Discuss whether schedule revisions are required to ensure that current work and subsequent work will be completed within the Contract Time. Review everything of significance which could affect the progress of the work.

- B. Within seven days after each progress meeting date, the Engineer will forward copies of the minutes-of-the-meeting, to the Contractor.
- C. Immediately following each progress meeting where revisions to the Progress Schedule/Critical Path Schedule have been made or recognized (regardless of whether agreed to by each entity represented), revise the Schedule. Reissue revised Schedule within 10 days after meeting. At intervals matching the preparation of payment requests, revise and reissue the Schedule to show actual progress of the work in relation to the latest revision of the Schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01200

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, Samples, Construction Photographs, and Construction Schedules. Additional general submission requirements are contained in Paragraphs 6.17 of the General Conditions. Detailed submittal requirements will be specified in the technical specifications sections.
- B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing No. or Detail as applicable. Submittals shall be clear and legible and of sufficient size for sufficient presentation of data.

1.2 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

A. Shop Drawings

- 1. Shop drawings, as defined in the General Conditions, and as specified in individual work Sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the Work.
- 2. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.
- 3. The Contractor shall check all subcontractor's shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.
- 4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

5. Submittals for equipment specified under Division 2 shall include a listing of all installations where identical or similar equipment has been installed and been in operation for a period of at least one year.

B. Product Data

1. Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliance's and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the Work.

C. Samples

1. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.

1.3 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:
 1. Field measurements
 2. Field construction criteria
 3. Catalog numbers and similar data
 4. Conformance with the Specifications
- B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product

data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Resident Project Representative a copy of each submittal transmittal sheet for shop drawings, product data and samples at the time of submittal of said drawings, product data and samples to the Engineer.

- C. The review and approval of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his/her responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.
- D. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
- E. Project work, materials, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

1.4 SUBMISSION REQUIREMENTS

- A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.
- B. Each submittal, appropriately coded, will be returned within 30 working days following receipt of submittal by the Engineer.
- C. Number of submittals required:
 - 1. Shop Drawings as defined in Paragraph 1.2 A: Six copies.
 - 2. Product Data as defined in Paragraph 1.2 B: Six copies.
 - 3. Samples: Submit the number stated in the respective Specification Sections.
- D. Submittals shall contain:
 - 1. The date of submission and the dates of any previous submissions.
 - 2. The Project title and number.
 - 3. Contractor identification.
 - 4. The names of:
 - a. Contractor

- b. Supplier
- c. Manufacturer
- 5. Identification of the product, with the specification section number, page and paragraph(s).
- 6. Field dimensions, clearly identified as such.
- 7. Relation to adjacent or critical features of the Work or materials.
- 8. Applicable standards, such as ASTM or Federal Specification numbers.
- 9. Identification of deviations from Contract Documents.
- 10. Identification of revisions on resubmittals.
- 11. An 8-in x 3-in blank space for Contractor and Engineer stamps.

1.5 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

- A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:
 - 1. as permitting any departure from the Contract requirements;
 - 2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
 - 3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.
- B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.
- D. Submittals will be returned to the Contractor under one of the following codes.

Code 1 - "NO EXCEPTION TAKEN" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

Code 2 - "MAKE CORRECTIONS AS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

Code 3 - "SUBMIT SPECIFIED ITEM". This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 10 calendar days of the date of the Engineer's transmittal requiring the confirmation.

Code 4 - "REVISE AND RESUBMIT". This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 10 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

Code 5 - "REJECTED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.
- F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Not Approved" until resubmitted. The Engineer may, at his/her option, provide a list or mark the submittal directing the Contractor to the areas that are incomplete.
- G. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven working days prior to release for manufacture.
- H. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

1.6 DISTRIBUTION

- A. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be as directed by the Engineer but shall not exceed 6.

1.7 SCHEDULES

- A. Provide all schedules required by Articles 2 and 14, and elsewhere in the General Conditions.
- B. The Contractor shall submit a progress schedule before starting any work, in accordance with Article 2.05 of the General Conditions. The Contractor shall review the progress schedule with the Engineer periodically. Such review shall be made on a monthly basis or more frequently as required by the Engineer. The progress schedule shall be updated as required by the Engineer.

1.8 “OR EQUAL”

- A. Should the Contractor seek approval of a product other than the brand or brands named in these specifications, it shall furnish written evidence that such product conforms in all respects to the specified requirements, and that it has been used successfully elsewhere under similar conditions. Where the specified requirements involve conformance to recognized codes or standards the Contractor shall furnish evidence of such conformance in the form of test or inspection reports, prepared by a recognized agency, and bearing an authorized signature.
- B. Manufacturers’ standard data and catalog cut sheets will not be considered sufficient in themselves, and the Engineer will not be responsible for seeking further data from the manufacturer, or for otherwise researching the product. Failure to provide complete data will be cause for rejection of the product.
- C. The Contractor shall be responsible for all additional costs including license fees, foundation, piping and electrical work necessary to accommodate the proposed “or equal” equipment. Items which result in a cost reduction shall be presented and a change order reflecting 65% of the cost savings will be prepared and the contract price modified.

1.9 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

- A. If specifically required in other Sections of these Specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.10 GENERAL PROCEDURES FOR SUBMITTALS

- A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the

time specified in the individual work sections, of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01300

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a Professional Engineer registered in the Commonwealth of Massachusetts and that he/she has been employed by (Name of Contractor) _____ to design _____ in accordance with Specification Section _____ for the Weymouth Lower Central Interceptor Sewer Replacement project. The undersigned further certifies that he/she has performed the design of the _____, that said design is in conformance with all applicable local, state and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the Owner or the Owner's representative with seven days following written request therefor by the Owner.

P.E. Name

Signature

Address

Contractor's Name

Signature

Title

Address

CHANGE ORDER FORM
For
Lower Central Interceptor Sewer Improvements
Weymouth, MA

Date: _____

Change Order No.: _____

To: _____

The terms and conditions of the original Contract for this project shall govern this change.

Description of Change:

Total Amount of this Change Order: \$ _____

Original Contract Price: \$ _____

Adjusted Contract Price due to Previous Change Orders: \$ _____

The New Contract Price due to this Change Order will be: \$ _____

Change to Contract Time: _____ days

RECOMMENDED BY: _____

Title

ACCEPTED BY: _____

Title

ACCEPTED BY: _____

Town of Weymouth

Title

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SECTION 01311

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Prepare and submit to Engineer for review projected construction schedules. Update and revise schedules periodically to reflect progress of work.

1.3 FORM OF SCHEDULES

- A. Prepare in form of network analysis system using the Critical Path Method.
- B. Perform data preparation, analysis, charting and updating in accordance with pertinent recommendations contained in current edition of "CPM in Construction" manual of the Associated General Contractors.
- C. The network analysis system shall consist of a detailed network, mathematical analysis and a network diagram.
 - 1. The network diagram shall show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned by the Contractor. The basic concept of a network analysis diagram will be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities.
 - 2. Detailed network activities shown on the network diagram shall include, in addition to construction activities, the submittal for approval of samples and shop drawings, the procurement of critical materials and equipment and their installation and testing.
 - 3. Related activities shall be grouped on the network. The activities on the critical paths shall be highlighted. The network shall be time scaled using units of approximately one-half inch equals one week or other suitable scale approved by the Engineer. Weekends and holidays shall be indicated. Where slack exists, the activities shall be shown at the earliest time they are scheduled to be accomplished. Sheet size shall be 30" x 60" minimum.

4. The mathematical analysis of the network diagram shall include a tabulation of each activity shown on the detailed network diagram. The following information shall be furnished as a minimum for each activity.
 - a. Preceding and following event numbers.
 - b. Activity description.
 - c. Estimated duration of activities in units of working days (being the best estimate available at time of computation).
 - d. Earliest start date (by calendar date).
 - e. Earliest finish date (by calendar date).
 - f. Scheduled or actual start date (by calendar date).
 - g. Scheduled or actual finish date (by calendar date).
 - h. Latest start date (by calendar date).
 - i. Latest finish date (by calendar date).
 - j. Slack or Float.
 - k. Monetary value of activity.
 - l. Responsibility for activity (Prime Contractor, subcontractors, suppliers).
 - m. Manpower required by trade and by total. Graphic representatives will be allowed.
 - n. Equipment required.
5. The mathematical analysis shall list the activities in sorts or groups as follows:
 - a. By the preceding event number from lowest to highest and then in the order of the following event number.
 - b. By the amount of slack, then in order of activity number.
 - c. By responsibility in order of earliest start date.

1.4 REVIEW OF SYSTEM

- A. Participate in a review and evaluation of the proposed network diagrams and analysis by the Engineer. Revisions necessary as a result of this review shall be resubmitted to the Engineer within 10 days after the conference. Twenty days will be allowed for checking and further action by the Engineer. Progress payments will be withheld pending attainment of a mutually acceptable schedule. The mutually acceptable schedule shall then be the schedule to be used by the Contractor for planning, organizing, directing and executing the Work and for reporting progress. If the Contractor thereafter desires to make changes in his method of operating and scheduling he shall notify the Engineer in writing stating the reasons for the change. If the Engineer considers these changes to be of a major nature he may require the Contractor to revise and submit, without additional cost to the Owner, all of the affected portion of the network diagram and mathematical analysis to show the effect on the entire project. A change may be considered of a major nature if the time estimated to be required or actually used for an activity or the logic of sequence of activities is varied from the original plan to a degree that there is reasonable doubt as to the effect on the Contract completion date or dates. Changes which effect activities with adequate slack time shall be considered as minor changes, except that an

accumulation of minor changes may be considered as a major change when their cumulative effect might affect the Contract completion date.

1.5 UPDATES

- A. Submit at intervals of 30 days a report of the actual construction progress by updating the mathematical analysis. All contract changes, including pending and approved change orders and field orders shall be included in the update schedule. Revisions causing changes in the detailed network shall be noted on the network or a revised issue of the affected portions of the detailed network furnished. The network shall be revised as necessary for the sake of clarity.
- B. The report shall show the activities or portions of activities completed during the reporting period and their total value as basis for the Contractor's periodic request for payment. Coordinate with the schedule of breakdown of lump sum items. The report shall state the percentage of the Work actually completed and schedule as of the report date and the progress along the critical path in terms of days ahead or behind the allowable dates. If the project is behind schedule, progress along other paths with negative slack shall be reported. Percentage of work actually completed will be reviewed by the Engineer. If the Contractor fails to submit the required monthly reports and updates within the time prescribed, the Engineer may withhold approval of progress payment estimates until such time as the Contractor submits the required reports and updates. Three copies of the report shall be submitted for each update.
- C. Simultaneously submit a narrative report with the updated analysis which shall include but not be limited to a description of the problem areas, current and anticipated delaying factors, their impact, and an explanation of corrective actions taken or proposed.

1.6 SUBMITTALS

- A. Within 15 days after execution of the AGREEMENT, submit 3 copies of a preliminary schedule indicating planned operations during first 60 days. Include cost of activities expected to be completed before submission and approval of the complete schedule.
- B. Within 30 days after execution of the AGREEMENT, submit 3 copies of the complete network analysis system. After review, submit 3 copies of the mutually acceptable system.
- C. Submit 3 copies of monthly reports and updates by the tenth day of the month.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01311

SECTION 01350

HEALTH AND SAFETY PLAN

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall, prior to the start of work on the site, prepare and submit for review, a site-specific health and safety plan. Work may not proceed at the project site until the Owner and/or Engineer have reviewed and approved the Contractor's health and safety plan. Any delays incurred by the Contractor relating to reviews of the health and safety plan shall be the responsibility of the Contractor and constitute no additional costs or claims to the Owner. The Contractor is responsible for all safety precautions and maintaining a safe work site.
- B. The Excavation of contaminated soils areas is not anticipated. However, the Contractor shall provide appropriate equipment (e.g., temporary fencing, drums) in the event hazardous materials are spilled or encountered.
- C. Individuals involved in the excavation of potentially impacted soils shall be properly informed and trained in the recognition and response strategies involved with the hazards posed by these contaminants.
- D. The Contractor shall be cognizant of the minimum standards set forth in OSHA 29 CFR 1910.120. The health and safety plan shall include, but not be limited to the following:
 - 1. Identification of Contractor's Site Safety Officer.
 - 2. Identification of Contractor's Designated Field Personnel.
 - 3. Type of Medical Surveillance Program.
 - 4. Identification of Hazard and Risks Associated with the Project, such as pipe installation, foundation excavation, dewatering, concrete tank construction, building framing, mechanical and electrical work, and all work from subcontractors for masonry, roofing, etc.
 - 5. Contractor's Standard Operating Procedures including Personnel Training and Field Orientation; Personal Hygiene Requirements & Guidelines; Field Monitoring Requirements of Site Contaminants; Respiratory Protection Training & Requirements; Levels of Protection and Selection of Equipment Procedures; Zone Delineation of the Project Site; Site Security and Entry Control Procedures; Contingency and Emergency Procedures; and Listing of Emergency Contacts.

6. Contractor's air monitoring plan (if required) immediately adjacent to the work area, and at the fence line.
7. Contractor's dust suppression plan. If air monitoring indicates a higher level of protection than modified Level D, work will stop at no cost to Owner until proper engineering controls/dust suppression sufficiently address the elevated air monitoring results. Modified Level D protection for all onsite personnel is the minimum project requirement.
8. The Contractor must be aware of site specific requirements such as site security during non-working hours, limited work space, working adjacent to surface water bodies, and minimizing the effects of soil excavation to adjacent structures.
9. The Contractor shall make available complete sets of personal protective equipment and clothing to the Owner and Engineer for use during site inspections by the Owner and Engineer. These shall be supplied and maintained at no cost to the Owner, and shall be returned to the Contractor upon completion of the Work, except for expendable disposal protective clothing. Contractor shall provide a repository for collection of disposable health and safety materials. Collection and disposal of contaminated expendable supplies shall be at cost to the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01350

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes the following:
 - 1. Provide schedule of values covering each lump sum bid item.

1.3 SUBMITTALS

- A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTALS:
 - 1. Schedule of values.
 - a. Revise and resubmit schedule until acceptable to the Engineer.
 - 2. Itemize separate line item cost for work involving each lump sum item.
 - a. Ensure that the sum of the items listed in the schedule of values for each lump sum item equals the price bid for the respective lump sum item.
 - b. For "Mobilization and Demobilization", items such as Bond premium and temporary construction facilities may be listed separately in the schedule, provided amounts can be substantiated.
 - 3. Breakdown installed costs into:
 - a. Delivered cost of product.
 - b. Total installed cost with overhead and profit.
 - (1) Do not list overhead and profit as separate items.
 - c. For water pipelines, include a breakdown for testing, chlorinating and putting into service.

4. An unbalanced schedule of values providing for overpayment on items of work performed first will not be accepted.

1.4 SEQUENCING AND SCHEDULING

- A. Prepare schedule of values covering each lump sum item after review of tentative schedule at preconstruction conference, but before submission of first application for payment.
- B. Before submitting any application for payment, obtain the Engineer's approval of the Schedule of Values.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01370

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Provide digital construction photographs pertinent to the Contract work during the Contract period as specified and as directed by the Engineer.

1.3 SUBMITTALS

- A. Description of techniques, materials, equipment, and resolution proposed to be used.
- B. Two copies of USB Flash Drives containing all digital construction photos submitted on a monthly basis.

1.4 QUALITY ASSURANCE:

- A. Photographer to use techniques, material and equipment capable of producing photographs of high quality and resolution.

PART 2 - PRODUCTS

2.1 DIGITAL NEGATIVES

- A. Remain the property of the photographer.
- B. Capable of producing sharp prints of high resolution (minimum of 10 megapixels) typical of an 8 inch by 10 inch print.
- C. Photographer to retain digital negatives for a period of at least two years from the date of final acceptance of the entire work under the Contract.
- D. A minimum of 30 digital construction photos documenting construction activities shall be saved to a USB Flash Drive and submitted to the Engineer on a monthly basis.

2.3 PRINT IDENTIFICATION

- A. Each file shall carry identification consisting of date photograph taken

(Month/Day/Year format) and primary subject of photograph.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All views to contain a relative dimension reference that is easily recognizable by the average person. In views where dimensions are critical use a recognizable measuring devices such as folding ruler, measuring tape in a manner the markings are clear and sharp in the photograph and the device located in close relationship with subject of photograph.

3.2 SITE PHOTOGRAPHY REQUIRED

- A. Provide photographs at following stages of construction:
 - 1. Sewer alignment before commencement of any construction. Provide photos and documentation of all private and public property structures (docks, fencing, walls, etc) that will be affected by proposed construction. Refer to Section 01050 for preconstruction survey requirements.
 - 2. At 1-month intervals, progress photography during construction. Photos of any month need show only new work performed during month.
 - 3. Sewer alignment upon completion of construction. Provide post-construction photos and documentation of site restoration of all private and public property structures (docks, fencing, walls, etc).
 - 4. Such special photographs required by Engineer.
- B. Views:
 - 1. Coordinate with Engineer on views to be taken. In general, views from locations to adequately illustrate state of project and condition of construction.
 - 2. At least 3 different views of photographic subject except over-all site photography to have at least 4 different views unless otherwise approved by Engineer.
 - 3. Succeeding photography of same photographic subject to be taken, insofar as practical, from the same view points as preceding photographic sessions. Variations in this procedure to be approved by Engineer.

END OF SECTION 01380

SECTION 01400

QUALITY ASSURANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section covers Quality Assurance and Control requirements for this contract.
- B. The Contractor is responsible for controlling the quality of work, including work of its subcontractors and suppliers and for assuring the quality specified in the Technical Specifications is achieved.
- C. Refer to the Article 6 - Contractor's Responsibilities, paragraphs 6.01 6.02, 6.03, of the GENERAL CONDITIONS.

1.3 TESTING LABORATORY SERVICES

- A. All tests which require the services of a laboratory to determine compliance with the Contract Documents shall be performed by an independent commercial testing laboratory acceptable to the Engineer. The laboratory must be certified by the Commonwealth of Massachusetts for the parameters tested and required under the project. The laboratory shall be staffed with experienced technicians, properly equipped, and fully qualified to perform the tests in accordance with the specified standards.
- B. Preliminary Testing Services: Unless otherwise specified, the Contractor shall be responsible for all testing laboratory services in connection with concrete materials and mix designs, the design of asphalt mixtures, gradation tests for structural and embankment fills, backfill materials, and all other tests and engineering data required for the Engineer's review of materials and equipment proposed to be used in the Work. The Contractor shall obtain the Engineer's acceptance of the testing laboratory before having services performed, and the Contractor shall pay all costs for services.
- C. Quality Control Testing Services: Perform all quality control tests in the field or in the laboratory on concrete, asphalt mixtures, moisture-density (Proctor) and gradation tests on structural and embankment fills, and backfill materials, in-place field density tests on structural and embankment fills, and other materials and equipment, during and after their incorporation in the Work. Field sampling and testing shall be performed in the general manner indicated in the specifications, with minimum interference with construction operations. The Engineer shall determine the exact

time and location of field sampling and testing, and may require such additional sampling and testing as necessary to determine that materials and equipment conform with data previously furnished by Contractor and with the Contract Documents.

- D. Arrangements for delivery of samples and test specimens to the testing laboratory will be made by the Contractor. The laboratory tests shall be performed within a reasonable time consistent with the specified standards. Furnish a written report of each test to the Engineer.
- E. Contractor shall furnish all sample materials and cooperate in the sampling and field testing activities, interrupting the Work when necessary. When sampling or testing activities are performed in the field, the Contractor shall furnish personnel and facilities to assist in the activities.
- F. The Contractor shall not retain any testing laboratory against which the Owner or the Engineer have reasonable objection, and if at any time during the construction process the services become unacceptable to the Owner, or the Engineer, either the Owner or the Engineer may direct in writing that such services be terminated. The request must be supported with evidence of improper testing or unreasonable delay. If the Engineer determines that sufficient cause exists, the Contractor shall terminate the services and engage a different testing laboratory.
- G. Transmittal of Test Reports: Written reports of testing and engineering data furnished by the Contractor for the Engineer's review of materials and equipment proposed to be used in the Work shall be submitted as specified for Shop Drawings.
- H. The testing laboratory shall furnish four copies of a written report of each test performed by laboratory personnel in the field or laboratory to the Contractor. Distribution shall be two copies of each test report to the Engineer's Representative, one copy to the Owner, and one copy for the Contractor within three days after each test is completed.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Refer to Article 3 - Contract Documents: Intent, Amending, Reuse, of the General Conditions.
- B. Copies of applicable referenced standards are not included in the Contract Documents. Where copies of standards are needed by the Contractor for superintendence and quality control of the work, the Contractor shall obtain a copy or copies directly from the publication source and maintain at the jobsite, available to the Contractor's personnel, subcontractors, and Engineer.
- C. Quality of Materials: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and free from defects and imperfections, when installed or otherwise incorporated in the Work. Material and equipment shall not be used by the Contractor for any purpose other than that intended or specified unless such use is authorized by the Engineer.

- D. Where so specified, products or workmanship shall also conform to the additional performance requirements included within the Contract Documents to establish a higher or more stringent standard or quality than that required by the referenced standard.

1.5 OFFSITE INSPECTION

- A. When the specifications require inspection of materials or equipment during the production, manufacturing, or fabricating process, or before shipment, such services shall be performed by an independent testing laboratory, or inspection organization acceptable to Engineer in conjunction with or by the Engineer.
- B. The Contractor shall give appropriate written notice to the Engineer not less than 30 days before offsite inspection services are required, and shall provide for the producer, manufacturer, or fabricator to furnish safe access and proper facilities and to cooperate with inspecting personnel in the performance of their duties.
- C. The inspection organization shall submit a written report to the Contractor who shall provide copies to the Engineer.

1.6 MATERIALS AND EQUIPMENT

- A. The Contractor shall maintain control over procurement sources to ensure that materials and equipment conform to specified requirements in the Contract Documents.
- B. The Contractor shall comply with manufacturer's printed instructions regarding all facets of materials and/or equipment movement, storage, installation, testing, startup, and operation. Should circumstances occur where the contract documents are more stringent than the manufacturer's printed instructions, the Contractor shall comply with the specifications. In cases where the manufacturer's printed instructions are more stringent than the contract documents, the Contractor shall advise the Engineer of the disparity and conform to the manufacturer's printed instructions. In either case, the Contractor is to apply the more stringent specification or recommendation, unless approved otherwise by the Engineer.

1.7 SHOP AND FIELD TESTING

- A. The Contractor is also responsible for providing the shop and field testing specified in the technical specification sections.
- B. The Contractor and its Subcontractor shall perform inspections, tests, and other services as required by the Contract Documents.
- C. Contractor shall provide twenty one days notice to the Engineer so that the Engineer may witness Contractor and/or Subcontractors off site and on site tests. The Engineer's witnessing of tests does not relieve the Contractor and/or Subcontractors of their obligation to comply with the requirements of the Contract Documents.

1.8 MANUFACTURER'S FIELD SERVICES

- A. When specified in the technical specifications sections, the Contractor shall arrange for and provide technical representation from manufacturer's of respective equipment, items or components. The manufacturer's representative shall be a factory trained service engineer/technician with the type and length of experience specified in the technical specifications.
- B. Services Furnished Under This Contract: An experienced, competent, and authorized factory trained service engineer/technician representative of the manufacturer of each item of equipment for which field services are indicated in the specifications shall visit the site of the Work and inspect, operate, test, check, adjust if necessary, and approve the equipment installation. In each case, the manufacturer's service representative shall be present when the equipment is placed in operation. The manufacturer's service representative shall revisit the jobsite as often as necessary until all problems are corrected and the equipment installation and operation are satisfactory to the Engineer.

1.9 CERTIFICATION FORMS AND CERTIFICATES

- A. The Contractor shall be responsible for submitting the certification forms and certificates in conformance with the requirements specified in Section 01300 - Submittals.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 QUALITY CONTROL

- A. Quality control is the responsibility of the Contractor, and the Contractor shall maintain control over construction and installation processes to assure compliance with specified requirements.
- B. Certifications for personnel, procedures, and equipment associated with special processes (e.g., welding, cable splicing, instrument calibration, surveying) shall be maintained in the Contractor's field office, available for inspection by the Engineer. Copies will be made available to the Engineer upon request.
- C. Means and methods of construction and installation processes are the responsibility of the Contractor, and at no time is it the intent of the Engineer or Owner to supersede or void that responsibility.

END OF SECTION 01400

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 HOURS OF CONSTRUCTION

- A. Normal construction activity shall take place only between the hours of 7 a.m. to 7 p.m., excluding Saturdays, Sundays, and legal holidays. Work outside the above time periods will be permitted only on an emergency basis and only with the written approval of the Owner.
- B. Pipe Jacking, as per Section 02340 Paragraph 3.4, will be allowed to operate 24 hours a day, 7 days a week for the duration of the pipe jacking procedure. Once pipe jacking is completed, as per Section 02340 Paragraph 3.4, construction activity will be restricted to the hours stated in Paragraph 1.2.A of this Section.
- C. Work in streets, roadways and areas adjacent to them shall cease at noon on days before legal holidays and at noon on Fridays prior to Monday holidays.

1.3 OCCUPYING PRIVATE LAND

- A. The Contractor shall not (except after written consent from the proper parties) enter or occupy with men, tools, materials, or equipment any land outside the rights of way or property of the Owner.

1.4 DIMENSION OF EXISTING STRUCTURES

- A. Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the Work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment that is dependent on the correctness of such information.

1.5 OPEN EXCAVATIONS

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, fencing, caution signs, lights, and other means to prevent accidents to persons and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the

particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, and requiring that the trench shall not remain open overnight.

- B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.
- C. Open trenches must be backfilled at the end of the workday.

1.6 INTERFERENCE WITH AND PROTECTION OF STREETS

- A. Contractor shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefore from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the proper authorities.
- B. Streets, roads, private ways, and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore.
- C. The Contractor shall, at least 24 hours in advance, notify the Police, Fire and School Departments in writing, with a copy to the Engineer, if the closure of a street or road is necessary. He shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well lighted, in order to minimize confusion.
- D. Construction parking shall be allowed only in areas approved by the Owner. Contractor to request permission from the Engineer for any parking outside of the temporary construction staging area at Newell Park.

1.7 WATER FOR CONSTRUCTION PURPOSES

- A. The Contractor will be allowed to use water from the Town of Weymouth for construction testing and start-up purposes.
- B. The express approval of the Water Department of the Town shall be obtained before water is used. Water shall be metered as specified by the Town. Hydrants shall only be operated under the supervision of the Town of Weymouth personnel. Hydrant meters shall be obtained from the Water Department for the standard deposit fee.
- C. No direct cross connections will be permitted between the public water supply and the new water mains, or any other point where the possibility of backflow of contaminated water exists. All connections to points where there is the possibility of backflow shall be arranged to prevent backflow and shall be approved by the Town's Plumbing Inspector before they are put into operation.

1.8 TEMPORARY UTILITIES

- A. Temporary Light and Power: The Contractor shall at his own expense, provide his own temporary light and power as required for the prosecution and completion of work.
- B. Temporary Telephone: The Contractor shall have installed at his own expense a job telephone for his use and for the use of the Engineer. The Contractor shall pay all phone charges.
- C. Sanitary Provisions: The Contractor shall provide and maintain sanitary accommodations for the use of his employees and the Engineer, as may be necessary to comply with the requirements and regulations of the local and state departments of health.
- E. Maintaining Operation of the Existing Facilities:
 - 1. The Contractor shall be responsible for careful consideration of the construction, scheduling and anticipation of potential interference with existing utilities, operations and structures. The Contractor shall maintain close communications with the Engineer and provide the Engineer with a detailed description of each proposed activity sufficiently in advance of its commencement for review and comments to be made.
 - 2. Temporary facilities which maybe required include, but are not limited to, electrical power; lighting; heating; cooling; ventilating; telephone; potable water; fire protection; drainage; sanitary facilities; trench covers; protection of existing utilities; structures; streams; trees and shrubs; access roads; sewage conveyance; and piping.

1.9 ACCESS TO THE WORK

- A. The Contractor shall provide sufficient and proper facilities at all times for inspection of all work under this project in preparation or in progress, by the Owner, the agents and employees of the Owner, by authorized representatives of the State of Massachusetts and the Federal Government and by the Engineers.
- B. The Contractor shall furnish the Engineer or his authorized representative and other personnel mentioned above with such facilities and assistance as are necessary to ascertain performance of the work in accordance with the plans and specifications.

1.10 PRECAUTIONS DURING ADVERSE WEATHER

- A. During adverse weather and against the possibility thereof, the Contractor shall take all necessary precautions so that the Work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building-paper shelters, or other suitable means.

- B. During cold weather, materials shall be preheated, if required, and the materials and adjacent structure into which they are to be incorporated shall be made and kept sufficiently warm so that a proper bond will take place and a proper curing, aging, or drying will result. Protected spaces shall be artificially heated by suitable means which will result in a moist or a dry atmosphere according to the particular requirements of the work being protected. Ingredients for concrete and mortar shall be sufficiently heated so that the mixture will be warm throughout when used.

1.11 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

1.12 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.
- B. Assistance will be given the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.
- C. Protection and temporary removal and replacement of existing utilities and structures as described in this section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the Total Price Bid in the Bid Form.
- D. The Contractor shall comply with the requirements of the Commonwealth of Massachusetts Statute - Chapter 82, Section 40, for excavations in public and private property.
- E. The Contractor shall notify Massachusetts Dig Safe (1-888-344-7233) at least 72 hours before digging, trenching, blasting, demolishing, boring, backfilling, grading, landscaping or other earth moving operations in any public ways, rights of way and easements.

- F. The Contractor shall notify all utility companies at least 72 hours (excluding Saturdays, Sundays and legal holidays) before excavating in any public way.

1.13 INSPECTION OF WORK AWAY FROM THE SITE

- A. If work to be done away from the construction site is to be inspected on behalf of the Owner during its fabrication, manufacture, or testing, or before shipment, the Contractor shall give notice to the Engineer of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

1.14 COOPERATION WITHIN THIS CONTRACT

- A. All firms or persons authorized to perform any work under this Contract shall cooperate with General Contractor and his Subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

1.15 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

- A. During the course of the work, the Contractor shall keep the site of his operations in as clean and as neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.
- B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor and his subcontractors shall comply with all applicable Federal, State, and local laws, and regulations concerning waste material disposal, as well as the specific requirements stated in this section and elsewhere in the Specifications.
- C. The Contractor is advised that the disposal of excess excavated material in wetlands, stream corridors, and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him, will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. Therefore, the Contractor will be required to remove the fill at his own expense and restore the area impacted.

1.16 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions

injured shall be reconstructed by the Contractor at its own expense.

- B. All structures shall be protected in a manner approved by the Engineer. Should any parts of the structures become heaved, cracked, or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at his own expense and to the satisfaction of the Engineer.
- C. If, in the final inspection of the work, any defects, faults or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein for at least the guarantee period described in the Contract Documents.
- D. The Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

1.17 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 water as necessary, so as to minimize the creation and dispersion of dust.

1.18 POLLUTION CONTROL

- A. The Contractor shall conduct clean-up and disposal operations, as necessary, to comply with state and local ordinances and anti-pollution laws.
- B. Outdoor burning of rubbish and waste material on the site will not be permitted.
- C. Disposal of volatile fluid wastes (such as mineral spirits, oil, gasoline, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01500

SECTION 01600

CONTROL OF MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 APPROVAL OF MATERIALS

- A. Unless otherwise specified, only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the Engineer. No material shall be delivered to the work without prior approval of the Engineer.
- B. As specified in Section 01300, the Contractor shall submit to the Engineer, data relating to materials and equipment he proposes to furnish for the work. Such data shall be in sufficient detail to enable the Engineer to identify the particular product and to form an opinion as to its conformity to the specifications.
- C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during the progress of the work, the Contractor shall submit additional samples or materials for such special tests as may be necessary to demonstrate that they conform to the specifications. Such samples shall be furnished, stored, packed, and shipped as directed at the Contractor's expense. Except as otherwise noted, the Owner will make arrangements for and pay for the tests.
- D. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of a claim against the Owner or the Engineer.
- E. In order to demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes, and surfaces, the Contractor shall provide such samples of workmanship or finish as may be required.
- F. The materials and equipment used on the work shall correspond to the approved samples or other data.

1.3 BOLTS, ANCHOR BOLTS AND NUTS

- A. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the Contractor in accordance herewith. Anchor bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.

- B. All anchor bolts, nuts, washers, plates, and bolt sleeves shall be stainless steel unless otherwise indicated or specified.
- C. Expansion bolts shall have malleable iron and lead composition elements of the required number of units and size.
- D. Unless otherwise specified, stud, tap, and machine bolts, and nuts shall conform to the requirements of ASTM Standard Specification for Carbon Steel Externally and Internally Threaded Standard Fasteners, Designation A307. Hexagonal nuts of the same quality of metal as the bolts shall be used. All threads shall be clean cut and shall conform to AN Standard B1.1 for Unified Inch Screw Threads (UN and UNR Thread Form).
- E. Bolts, anchor bolts, nuts, and washers, specified to be galvanized, shall be zinc coated, after being threaded, by the hot-dip process in conformity with the ASTM Standard Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip, Designation A123, or the ASTM Standard Specifications for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Designation A153, as is appropriate.
- F. Bolts, anchor bolts, nuts, and washers specified to be stainless steel shall be Type 316 stainless steel. All anchor bolts, nuts, washers, plates and bolt sleeves to be submerged in a liquid shall also be Type 316 stainless steel.
- G. Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of acceptable design. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4 in. by 4 in. by 3/8 in. or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done by the Contractor and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.

1.4 REJECTED MATERIALS AND DEFECTIVE WORK

- A. Materials furnished by the Contractor and condemned by the Engineer as unsuitable or not in conformity with the specifications shall forthwith be removed from the work by the Contractor, and shall not be made use of elsewhere in the work. Any errors, defects or omissions in the execution of the work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good by and at the expense of the Contractor and in a manner satisfactory to the Engineer. The Contractor shall reimburse the Owner for any expenses, losses or damages incurred in consequence of any defect, error, omission or act of the Contractor or his employees, as determined by the Engineer, occurring previous to the final payment.

PART 2 - PRODUCTS (NOT USED)

PAGE 3 - EXECUTION (NOT USED)

END OF SECTION 01600

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SECTION 01610

DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This section specifies the general requirements for the delivery, handling, storage and protection for all items required in the construction of the work. Specific requirements, if any, are specified with the related item.

1.3 TRANSPORTATION AND DELIVERY

- A. Transport and handle items in accordance with manufacturer's printed instructions.
- B. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer.
- C. Deliveries shall only be allowed during the established work hours between 7:00 a.m. and 7:00 p.m.
- D. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.
- E. Deliver products to the site in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.
- F. All items delivered to the site shall be unloaded and placed in a manner which will not hamper the Contractor's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
- G. Provide equipment and personnel to unload all items delivered to the site.
- H. Promptly inspect shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify Engineer verbally, and in writing, of any problems.

1.4 STORAGE AND PROTECTION

- A. Store and protect products in accordance with the manufacturer's printed instructions, with seals and labels intact and legible. Storage instruction shall be studied by the Contractor and reviewed with the Engineer by him. Instructions shall be carefully followed and a written record of this kept by the Contractor. Arrange storage to permit access for inspection.
- B. Store loose granular materials on solid flat surface in a well-drained area. Prevent mixing with foreign matter.
- C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulation of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in manner to reduce breakage, cracking and spalling to a minimum.
- D. All mechanical and electrical equipment and instruments subject to corrosive damage by the atmosphere (even though covered by canvas) shall be stored in a weathertight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the Engineer. Building shall be provided with ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01610

SECTION 01620

IDENTIFICATION SYSTEMS (PROJECT SIGNS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This section includes the following:
 - 1. Furnish, install, and maintain project sign.
 - 2. Furnish, install, and maintain DEP project file number signs.
 - 3. Remove signs on completion of construction.
 - 4. Allow no other signs to be displayed.

1.3 SYSTEM DESCRIPTION

- A. Project Signs:
 - 1. Painted signs with painted lettering, or standard products:
 - a. Size of signs and lettering: As required by regulatory agencies, and/or as specified herein or as appropriate to usage.
 - b. Colors: As required by regulatory agencies, otherwise uniform colors throughout Project.
 - c. Furnish, erect, and maintain job instruction signs, such as "DANGER," "KEEP OFF," "NO PARKING," etc., as may be required to conduct the Work safely. Such signs shall be neat in appearance, maintained in good condition, and promptly removed when they have served their purpose.
 - 2. Erect at appropriate locations to provide required information.

1.4 SUBMITTALS

- A. Submit project sign layout for Engineer's approval in accordance with the Conditions of the Contract and Division 1 Specification sections and as specified herein.

1.5 QUALITY ASSURANCE

- A. Finishes, Painting: Project sign shall resist weathering and fading for the duration of the construction period.

1.6 MAINTENANCE

- A. Maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Wood Exterior Paint
 - 1. Sherwin-Williams or approved equal.

2.2 MATERIALS

- A. Project Sign Materials
 - 1. Structure and Framing: May be new or used, wood in sound condition, structurally adequate to work, and suitable for specified finish.
 - 2. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints:
 - a. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.
 - 3. Wrought Hardware: Galvanized.
 - 4. Alkyd Gloss Paint System:
 - a. Give priming coat (2.5 mil thick) to entire woodwork of sign.
 - b. Give two (2) (1.5 mil) coats of white exterior Alkyd Gloss paint to sign including framework.
 - 5. Sign shall be a minimum size of 48 - inches by 96 - inches.
- B. DEP Project File Number Signs
 - 1. The signs shall be professionally prepared. Each sign shall be constructed of $\frac{3}{4}$ -inch minimum thickness exterior plywood (A-B) or APA high density overlay plywood (HDO).
 - 2. All fasteners used in the sign construction shall be galvanized or stainless steel. All fasteners shall be rustproof.

3. The sign face backgrounds shall consist of at least three (3) coats of white outdoor enamel paint. The rear side to be painted with one (1) coat of white outdoor enamel paint. All lettering shall be black.
 4. The Conservation Commission project file number signs shall be not less than 2-feet square or more than 3-feet square in area. The signs shall bear the words "Massachusetts Department of Environmental Protection File Number 081-1313".
 5. Provide a total of four DEP Project File Number Signs. Sign locations to be coordinated with the Engineer.
- C. Signs shall be weather resistant material.

PART 3 - EXECUTION

3.1 PREPARATION

A. Project Sign

1. Wood surface shall be clean and dry. Paint exposed surface of supports, framing, and surface material; one coat of primer and two coats of exterior paint as indicated herein.
2. Paint graphics in styles, sizes, and colors selected.
3. Sign layout as approved by Engineer and Owner.

3.2 ERECTION

A. Project Sign:

1. Erect project signs at location selected by Engineer.
2. Maintain in good condition until completion of project.
 - a. Remove signs, framing, supports, and foundations at completion of project.

B. DEP Project File Number Signs

1. Mount sign at four locations along the project site as directed by the Engineer.

END OF SECTION 01620

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Closeout procedures.
 - 2. Final cleaning.
 - 3. Record Documents.

1.3 RELATED WORK

- A. Cleaning up requirements are included in Section 01710.

1.4 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Provide submittals to Engineer that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payment, and sum remaining due.
- D. Submit all warranties (as applicable).
- E. Submit written notice that all subcontractors and suppliers have been paid in full.
- F. Submit written notice showing the disparities of all insurance filings and claims.
- G. Copy of "Statement of Compliance" filed with the Division of Labor and Workforce Development, as required under the State Wage Rate Provisions.

1.5 RECORD DOCUMENTS

- A. Maintain on site, one set of the following documents; actual revisions to the Work shall be recorded in these documents:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change orders and other Modifications to the Contract
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Written interpretations and clarifications.
 - 7. Field orders.
 - 8. Field test reports properly verified.
 - 9. Upon completion of the project Record Drawings shall be submitted to the Engineer.
- B. Store As-built Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
 - 1. Manufacturer's name, address and telephone number and product model and serial number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and Modifications.
- E. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical location of excavation limits referenced to permanent surface bounds.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension of detail.
5. Details not on original Contract Drawings.

1.6 FINAL CLEANING

- A. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 1. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01700

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SECTION 01710

CLEANING UP

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. During its progress, the work and the adjacent areas affected thereby shall be cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.
- B. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc., shall, upon completion of the work, be left in a clean and neat condition.
- C. On or before the completion of the work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.
- D. The Contractor shall thoroughly clean all materials and equipment installed by him and his sub-contractors, and on completion of the work shall deliver it undamaged and in fresh and new-appearing condition.
- E. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, retaining wall, hardscape, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practical as work progresses and shall not be left until the end of the contract period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01710

SECTION 01850

TRAFFIC MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- B. The Massachusetts Department of Transportation Construction Standards, most recent version, shall apply to all materials furnished under this section. When conflicts arise between this specification and the Construction Standards, the Contractor shall coordinate with the Owner and/or Engineer for a final decision.

1.2 SUMMARY

- A. This section includes the following:
 - 1. Pedestrian, vehicular traffic and other safety control devices, construction signs, requirements, and management for the protection of the traveling public and working personnel during construction and related operations.
 - 2. Establishing, maintaining, and removing detour routes as shown on the Plans or as directed by the Owner and/or Engineer in order to perform the proposed construction.
 - 3. The design, application, and installation of all devices required by this section shall conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) latest edition, Part VI, published by the Federal Highway Administration (FHWA), the Massachusetts Amendments to the MUTCD latest edition, MassDOT Work Zone Safety Guidelines for Massachusetts Municipalities and Contractors, MassDOT Construction and Traffic Standard Details (1996), Americans with Disabilities Act (ADA), and the Massachusetts Department of Transportation Standard Specifications for Highways and Bridges with all subsequent Special Provisions and Supplemental Specifications, hereinafter referred to as the "MassDOT Standard Specifications", Section 850, and MassDOT "Standard Details and Drawings for the Development of Temporary Traffic Control Plans", except as modified herein.
 - 4. Traffic management during construction and maintenance operations includes installing and maintaining temporary vehicular, pedestrian

and construction facilities, furnishing, installing, inspecting, positioning, repositioning, and removing channelization devices necessary to maintain pedestrian and vehicular traffic during construction and fencing of excavations as required for the protection of the public and all project personnel.

5. All construction vehicles not protected by any form of traffic control device on a project which is open to traffic shall have an amber flashing light mounted on the cab roof or on the highest practical point of the machinery. The light shall be in operation whenever the equipment is working on the highway or travel-way. Amber flashers must be a minimum of 40 candelas and have a flashing frequency of 50 to 60 times per minute. Either rotating beacons or strobe lights meeting these requirements are acceptable.
6. All materials provided by the Contractor under the items of this section shall remain the property of the Contractor upon completion of the project, unless otherwise specified below.
7. Any traffic management and traffic detours proposed by the Contractor shall be subject to approval by the Owner and/or the Engineer. The Contractor shall provide detailed Traffic Management Plans and detour maps indicating the proposed detour routes, all proposed signs, the proposed hours of operation, the proposed locations of police detail officers and barricades for each phase of construction two weeks before the intended implementation date for approval by the Owner and/or the Engineer. Work shall not proceed without specific notice to and approval of the Owner and/or the Engineer. Any detours or changes in normal traffic patterns or road closures shall be coordinated by the Contractor with the Owner and/or Engineer, local Police Department, and Fire Department.
8. "Approved by the Owner" throughout this Section shall mean the approval of the Town of Wey.

1.3 HOURS OF OPERATION

A. Town Owned Roadways

1. Daily restricted hours of operation shall be between 7:00 am and 5:00 pm Monday through Friday.
2. Construction shall be coordinated around other nearby construction projects and heavy seasonal traffic which may further prohibit construction in the streets during certain periods to retain adequate circulation. The Contractor shall not have any claim for the extension of time for the completion of work under this contract as a result of the restriction.

3. The Contractor can request permission for construction on holidays and Saturdays during off peak seasons. Such work cannot be performed without permission from the Owner and/or the Engineer.

B. Route 6

1. Two lanes of traffic are expected to be open during work. All work shall be completed during the day, between the hours of 7:00 am and 5:00 pm.

1.4 SUBMITTALS

A. Shop Drawings: Contractor shall submit the following in accordance with Section 01300 – SUBMITTAL PROCEDURES:

1. Traffic Management Plans: Where designs for pedestrian and traffic control devices are not specifically indicated on the Contract Drawings or for any variations from the Traffic Management Plans on the Contract Drawings, the Contractor shall prepare and submit to the Owner and/or Engineer for approval, a traffic management plan, complete with details of the proposed methods, including materials for approval two weeks before implementation. This includes but is not limited to road closures and detour routes for each phase of construction including time periods of work, temporary pedestrian and construction facilities, locations of signage, portable changeable message signs, police and other traffic control devices to maintain traffic and access to abutting properties.
2. Shop Drawings
 - a. Submit complete shop drawings for traffic management plans, including temporary pedestrian sidewalks and driveways, as needed, certified by a Professional Engineer registered in the Commonwealth of Massachusetts.
 - b. Show on the shop drawings all materials, including traffic control devices, signs and methods of installation.
 - c. Include with the shop drawings alignment tapers, lane widths, police detail locations, temporary pavement markings, barriers and traffic control device spacing.
 - d. The Contractor shall submit in writing proposed road closures and anticipated detour routes and signage based on the provided information for approval two weeks prior to implementation.
3. Safety Signing for Construction Operations. Where not indicated on the Contract Drawings, the Contractor shall submit temporary traffic

management plans and sign placement and size sketches showing the proposed sign setups he intends to use to provide the necessary traffic control and protection during the progress of the work, plus the sign and legend size and layout. These sketches shall also be submitted to the Owner and/or Engineer for review and approval two weeks before work begins. Particular care shall be taken to establish and maintain methods and procedures that will not create unnecessary or unusual hazards to public safety. Traffic control devices required only during working hour operations shall be removed and the appropriate signs shall be covered at the end of each working day.

4. The Contractor shall submit to the Owner and/or Engineer the information required by this section a minimum of two weeks prior to the start of construction and prior to the start of construction at any new location throughout the duration of work under this contract for approval. Work shall not proceed without specific notice to and approval of the Owner and/or Engineer.

1.5 QUALITY ASSURANCE

- A. Provide in accordance with Section 01400.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Provide in accordance with Section 01600 and as specified.
- B. No material shall be stored within the work area or on adjacent roadways or residential streets except which is needed for work being performed for that day.

1.7 TRAFFIC CONTROL REQUIREMENTS

- A. The Contractor shall meet the following conditions, unless otherwise specifically approved by the Owner and/or Engineer:
 1. All work shall be prosecuted with proper regard for the convenience of the public and in a manner to permit unimpeded traffic flow whenever possible. The interruption of traffic will not be permitted unless specifically allowed by the Owner and in accordance with the requirements of the Owner and/or Engineer and in conformance with MUTCD requirements.
 2. Traffic control devices and signs shall be removed, demounted or properly covered for those periods of the day not in use or not applicable.
 3. The Contractor shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefore from the

proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards without delay that are acceptable to the Owner and/or Engineer.

4. Streets, roads, private ways, and walks under construction and not closed shall be maintained passable and safe at all times by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore.
5. The Owner and/or Engineer shall be notified of any re-routing of traffic two weeks in advance. Approval must be obtained from the Owner and/or Engineer prior to any rerouting of traffic (except emergencies). Following receiving approval from the Owner and/or Engineer, it will be the Contractor's responsibility to coordinate with other agencies or departments including Police and Fire Department in writing a minimum of 72 hours prior to road closures. This will include providing the Police Department, Fire Department and Department of Public Works with the following information:
 - a. A list of streets and intersections where work will be in progress to be supplied at intervals as required by the Owner and/or Engineer.
 - b. Immediate notification of any utility breaks.
6. The Contractor is responsible for notifying abutters of anticipated construction adjacent to their property and the anticipated temporary alterations in circulation through distribution of written notices 72 hours in advance.
7. No operations shall be conducted, including the loading or unloading of vehicles, on or near the traveled lanes or road shoulders without first erecting warning signs and channelizing devices as directed. These precautions shall be maintained at all times while work is in progress.
8. Construction signs and channelizing devices shall be used to separate traffic from the work areas and for traffic control. Placement, other than as shown in the Contract Drawings or the MUTCD, will require prior approval from the Owner and/or Engineer.
9. Temporary signs and channelizing devices shall not be set up until there is adequate visibility or appropriate construction lighting. The Contractor shall schedule his work so that temporary signs and channelizing devices are removed and traffic is returned to its normal pattern before the end of the work period.

9. Work operations shall not be performed on the roadway in such a manner that traffic is obstructed or endangered from either side of the roadway.
10. The Contractor shall keep all roadway areas open to traffic as clear as possible at all times. Materials shall not be stored on any roadway area or within 10 ft. of the traveled way. Material shall be delivered to the installation areas as they are needed to provide a continuous installation. Location of storage areas shall be subject to approval.
11. The Contractor shall remove all equipment and construction vehicles from the traveled way and shoulders open to traffic during non-work hours. Vehicles shall be parked no closer than 10 feet from the traveled way in pre-approved areas unless specifically permitted.
12. Temporary signs and channelizing devices shall not be set up in inclement weather.
13. The Contractor shall provide necessary, unimpeded access for fire apparatus and other emergency vehicles through the work zones to abutting properties at all times.
14. Sweeping and cleaning of surfaces beyond the limits of the project required cleaning up material caused by spillage or vehicular tracking during the various phases of the work shall be considered as incidental to the work being performed under the Contract and there will be no additional compensation. Sweeping and cleaning shall be done daily.

1.8 EXCAVATIONS

- A. The Contractor shall excavate for the amount of work to be completed and subsequently backfilled that same day (except for drilling, jacking and receiving pits). Open excavations shall not remain open through non-work hours, unless prior approval is obtained from the Owner and/or Engineer (except for drilling, jacking and receiving pits).
- B. All open excavations shall be adequately safe guarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Owner and/or Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, special construction procedures shall be taken, such as limiting the length of open trench.
- C. The Contractor shall not enter upon or occupy with men, tools, equipment or materials any property outside the rights-of-way or property of the Owner, except after the written consent of the Owner and/or Engineer.

- D. The Contractor shall erect substantial barriers at the ends of open ditches; stockpiled construction materials or other obstructions and shall erect warning signs and provide adequate lights or flares to guard the barriers, trenches, and excavation.
- E. At the end of each work day the Contractor shall fill in or cover with steel plates of adequate strength to carry traffic all open trenches, test pits or other excavations. The roadway shall be free of construction debris and excavated material and shall be relatively smooth to provide safe passage.
- F. At the end of each work week and as directed by the Engineer, backfilled excavations shall be paved with hot mix asphalt in accordance with the Drawings and Section 02576 of these specifications. Temporary paint pavement markings that match the existing markings disturbed by the excavation shall be applied to the new pavement in accordance with the MassDOT Standard Specifications and MUTCD.

1.9 COORDINATION OF WORK AREAS

- A. The Contractor shall be responsible for the coordination of his/her work with all utility or roadway work being performed by the Town and/or utility owners in relation to this project or projects near this project in order to retain adequate circulation throughout the area. The Contractor shall phase all work in a manner that will provide positive and safe through movement of traffic passing the construction site.

1.10 ACCESS TO PROPERTIES

- A. At least one serviceable driveway access to all residences and businesses within the project shall be maintained at all times.
- B. The Contractor shall coordinate the work with the schedules of delivery trucks to the adjacent stores and property owners so as not to impede their access.

1.11 HAULING

- A. The Contractor is advised that all roads and bridges within or adjacent to the project shall be subject to legal loads and vehicles.
- B. The Contractor is advised that no agreements have been made by the Town of Weymouth with surrounding cities, towns, or agencies to relieve the Contractor of liability for damage to local roads and bridges caused by the Contractor's operation. The Contractor shall contact appropriate officials of the surrounding cities or towns concerning hauling over city or town roads and bridges.
- C. The Contractor shall furnish 60" x 30" approved signs reading

“CONSTRUCTION VEHICLE - DO NOT FOLLOW” to be used on trucks hauling to the project, when such signs are deemed necessary by the Engineer. The color, type of sheeting and size of lettering shall conform to that of the permanent construction signs.

- D. Each driver of any vehicle used on this contract shall be furnished written instructions concerning the manner of operation for that vehicle. Specifically, these instructions shall warn against stopping on the traveled portions of the roadway, against passing other vehicles, and against traveling in close proximity to other vehicles. A copy of these instructions shall be given to the Engineer.

1.12 DETOUR ROUTE

- A. The Traffic Management Plan identifies roadways that may be considered for temporary detour routes for construction along Town owned roadways. Once specific staged work zones have been established by the Contractor, the Contractor shall submit detour routes and Traffic Management Plans to the Owner and/or Engineer for approval a minimum of two weeks prior to anticipated implementation.
- B. The Contractor shall coordinate and time construction with other construction projects nearby to maintain adequate circulation.
- C. The Contractor is permitted to install construction signage and other traffic control devices prior to opening the detour. Temporary traffic control devices installed prior to the detour shall be covered or rendered inoperative until the detour begins. Temporary traffic control devices no longer needed after the last day of the detour shall be covered until they are removed.
- D. Portable Changeable Message Signs (PCMS) will be in place and operational one week prior to anticipated construction to warn drivers of altered circulation patterns. Locations and messages for PCMS's will be shown on the Contractor's submitted Traffic Management Plans and as approved by the Owner and/or Engineer.
- E. The Contractor shall cover all existing traffic signs that are in conflict with the detour route. Existing pavement markings that conflict with detour traffic shall be removed in accordance with the MassDOT Standard Specifications, Section 850.
- F. Upon completion of the detour, the Contractor shall restore all pavement markings to the existing conditions and uncover existing traffic signs.

1.13 PEDESTRIAN TRAFFIC

- A. Sidewalks shall be maintained at all times throughout the construction period. Temporary sidewalks, pedestrian detours, and pedestrian and construction

facilities shall be constructed as needed to maintain pedestrian traffic and business access, as shown on the Plans or as directed by the Owner and/or Engineer. Walkways of 5 feet minimum width (not including curb width) will be provided at all times unless otherwise approved by the Owner and/or Engineer. All permanent and temporary sidewalk construction shall be in accordance with ADA requirements including clearance around obstructions, slopes, and alignments.

- B. Pedestrian access will be provided to abutting land uses such as residences and businesses at all times, as approved by the Owner and/or Engineer and in accordance with ADA requirements.
- C. Temporary pedestrian walkways shall be separated from roadway and constructed areas by barricades as approved by the Owner and/or Engineer.

1.14 CONSTRUCTION AND ADVANCE WARNING SIGNS

- A. Construction and advance warning signs shall be in accordance with the MUTCD, MassDOT Standard Specifications, Section 850 – Traffic Controls for Construction and Maintenance Operations and the provisions of this Section.
- B. Construction and advance warning signs shall be replaced, covered, uncovered, furnished, positioned, repositioned, inspected, maintained, and removed as often as necessary and or directed by the Owner and/or Engineer, including regulatory, warning, and guide signs and temporary bus stop signs and taxi stop signs and their supports.
- C. All signs which are damaged or are missing from their location will be replaced by the Contractor without additional compensation.
- D. All signs will be maintained by the Contractor in a satisfactory manner including the removal of dirt or road film that causes a reduction in sign retroreflectivity.
- E. Special construction signs will be furnished and installed by the Contractor during the work to improve traffic flow or safety, as directed by the Owner and/or Engineer.

1.15 PORTABLE CHANGEABLE MESSAGE SIGN

- A. Portable Changeable Message Signs shall be in accordance with the MassDOT Standard Specifications, Section 850 and the provisions of this Section.
- B. All messages signs location and displayed shall be submitted by the Contractor to the Owner and/or Engineer two weeks prior to construction for approval.

- C. Message signs shall be installed one week prior to detours being in place to warn drivers and shall be kept fully operational by the Contractor throughout the duration of the work.
- D. The Contractor shall be responsible for positioning, repositioning, operating, maintaining, revising messages, and removing the message signs as needed or as directed by the Owner and/or Engineer.

1.16 TRAFFIC CONTROL DEVICES

- A. Install, inspect, maintain, reposition and remove all temporary traffic control devices and construction elements as often as necessary and as directed by the Owner and/or Engineer in accordance with an approved construction staging sequence and traffic management plan.
- B. Materials required for the work of this Section need not be new, but must be in first-class condition and acceptable to the Owner and/or Engineer and meeting requirements set for the MUTCD and MassDOT standards. Any materials, that in the judgment of the Owner and/or Engineer, are unsatisfactory in appearance or performance shall be removed and immediately replaced by the Contractor with acceptable units.
- C. All traffic control devices shall be in accordance with MassDOT Standard Specifications, Section 850 and the provisions of this Section.
- D. Temporary Safety Signing
 - 1. Safety Signing shall consist of furnishing, positioning, repositioning, covering and uncovering, maintaining and removing, as needed and/or as directed: regulatory, warning, and guide signs together with their supports. If additional supports are needed due to site conditions they will be considered incidental to the work.
 - 2. Any temporary safety sign no longer applicable shall either be removed or covered as soon as possible.
 - 3. No temporary safety sign shall be visible to traffic that may conflict with actual roadway conditions.
 - 4. Signs over 50 square feet will require approval of design calculations and shop drawings of the breakaway support system if the signs are installed at an unprotected location.
 - 5. Site conditions including signage will be returned to pre-construction conditions at the completion of that phase of construction.

- E. Sign Covers

1. Cover any existing regulatory and warning signs as necessary and as directed by the Owner and/or Engineer. Also, cover and uncover all construction signage as needed during all work and non-work periods.
2. Use a cover approved by the Owner, which shall be securely fastened to the existing sign and shall completely cover the legend of the existing sign. The cover shall remain in place as long as necessary at which time it shall be promptly removed.
3. Signs shall be covered without causing any damage to the existing sign. Damaged signs will be replaced by Contractor at no additional cost to the Owner.

F. Reflectorized Drums

1. Reflectorized Drums consists of furnishing, positioning, repositioning, maintaining, and removing reflectorized plastic drums and necessary ballast, as needed and/or as directed by the Engineer including locations of lane closures, shifting traffic, road closures, channelizing or otherwise re-directed traffic. The use of cones will not be permitted.
2. Traffic Drums shall conform to Drawing No. TR.7.1 of the MassDOT Construction and Traffic Standard Details, 1996 edition and MUTCD.

1.17 POLICE DETAILS

- A. The Contractor shall coordinate with the Owner, Police Department, and Engineer to determine daily uniformed police detail requirements for the control of pedestrians and vehicular traffic within the project area for each stage of construction.
- B. The decision to use a police detail at a specific project location shall be shown on the traffic management plans approved by the Owner and/or Engineer or as directed by the Owner and/or Engineer.
- C. Contractor is responsible for scheduling of all uniformed police details. The Police Department will invoice the Owner directly for accepted Police Details.
- D. It is the Contractor's responsibility to cancel Police Details a minimum of four hours in advance of the start of the shift or two hours in advance of the start if inclement weather. The Contractor will be responsible to reimburse the Police when the cancellation notice is not given by the Contractor in a timely fashion. Lateness or failure to show on the part of the Contractor or inclement weather shall not excuse the Contractor from the obligation to give adequate notice to

the Police Department. Payment for Police Details not cancelled as required will be the responsibility of the Contractor.

- E. Road closures shall not be allowed without prior permission of the Owner, Police Department, and Fire Department.

1.18 PERMITS

- A. The Contractor shall be responsible for obtaining any permits to perform the work.

PART 2 - PRODUCTS

2.1. GENERAL

- A. Devices required under this Section need not be new but must be in first class condition and acceptable to the Owner and/or Engineer. The condition of the work zone traffic control devices shall meet the quality standards set forth in the Quality Standards for Work Zone Traffic Control Devices compiled by the American Traffic Safety Services Association (ATSSA). Any devices that, in the judgment of the Owner, are unsatisfactory in appearance and/or performance shall be removed and immediately replaced by the Contractor with acceptable devices.

2.2. PORTABLE CHANGEABLE MESSAGE SIGN

- A. The Portable Changeable Message Sign shall be capable of performing all functions at ambient temperatures ranging from -31° to 165 ° F (-35 ° to 74 ° C). There shall be no degradation of operation due to fog, rain or snow. A radar detector activator meeting the requirements shall be considered part of this item.
- B. Maintenance shall include periodic cleaning. When not being used the sign shall be stored in a secure area approved by the Owner and/or Engineer.
- C. The Portable Changeable Message Sign shall consist of the following major components:
 - 1. Message Sign:
 - a. Type – The technology can be LED or a combination of both Flip Disk and LED (Hybrid).
 - b. Matrix Displays – Shall be character, line or full matrix.
 - c. Size – The message sign shall have a minimum height of 6 feet, maximum height of 6.5 feet and a minimum width of 8 feet, maximum width of 12 feet.

- d. Colors – The display shall be either fluorescent yellow or ITE amber.
 - e. Lines – The message sign shall have the capability of displaying at least three lines of 18 inch characters with a minimum of 8 characters per line.
 - f. The sign shall be illuminated for nighttime visibility.
- 2. Operator Interface: A means of creating and controlling the display message(s) on-site and remotely through an NTCIP compatible IP addressable modem, shall be provided with each sign. The operator interface shall contain as a minimum the following:
 - a. Display terminal with keyboard to allow previewing the message content and format before it is sent to the sign panel. The keyboard shall be of a standard design.
 - b. Controller (CPU).
 - c. Lockable weatherproof enclosure for interface components.
- 3. Controller: The Controller shall possess, at a minimum, the following features:
 - a. Full 32K user memory with the option for additional archive memory.
 - b. Capacity to store a minimum of 50 messages .
 - c. Changeable message flash rate capability.
 - d. A minimum of 24 hour battery back-up.
 - e. Password activation shall be software available.
- 4. Power Supply: The sign shall be capable of operation from a diesel powered generator, a battery or solar power. The power supply shall be protected from the weather and be locked for security.
- 5. Trailer: The trailer shall have at least the following features:
 - a. A current Registry of Motor Vehicles registration.
 - b. Swivel jacks capable of leveling the trailer on a 1:6 (1 vertical to 6 horizontal) slope and capable of stabilizing the trailer in winds of up to 80 miles per hour.

- c. The sign shall be capable of being locked in a stowed position while being towed.
- d. A lift mechanism shall be provided to elevate the sign to its operating position.
- e. The capability to lock the sign panel in several off-angle positions with respect to the trailer axis.

2.3. TRAFFIC CONTROL DEVICES

A. Temporary Safety Signing

- 1. Rigid signs shall be fabricated from plywood, aluminum or approved alternate substrate material.
- 2. Plywood sign material shall be 5/8 inch Exterior MDO – General (one sided).
- 3. Aluminum sign material shall be Type A, 0.08 inches thick as specified in MassDOT Standard Specification Subsection 828.42.
- 4. Route marker overlay on directional sign panels shall be fabricated from Aluminum Alloy 5052-H38 0.08 inches thick.
- 5. The entire sign face shall be retro-reflectorized. Reflective sheeting shall meet the requirements of ASTM D4956 and AASHTO M268, and as Flexible High Intensity Prismatic (HIP) Sheeting to ASTM Type VII or better.
- 6. Rollup signs shall be fabricated from vinyl microprismatic retroreflective material.
- 7. Background sheeting for all construction warning signs shall be of a fluorescent orange color. The minimum spectral radiance factor, in accordance with Section 5.1 of ASTM E991, for the fluorescence shall be as follows:

New	110% minimum
Weathered	60% minimum

B. Arrow Board

- 1. The unit shall consist of a black background panel meeting the requirements of MUTCD Type C and shall contain at least 15 amber lamps of approximately 8,000 initial maximum candelas each.
- 2. Panels shall have the capability of the following mode selections: (1) left or right flashing or sequential arrows; (2) left or right sequential

chevrons; (3) flashing double arrow; (4) flashing caution and (5) alternating diamond caution.

3. Panels shall automatically provide for a minimum of 50 percent dimming from their rated lamp voltage at night. The flashing rate of the lamps shall not be less than 25 or more than 40 flashes per minute.
4. Minimum mounting height should be 7 feet above the roadway to the bottom of the panel, except on vehicle-mounted panels, which should be as high as practicable.
5. The arrow board shall include a radar detector activator meeting its requirements.

C. Reflectorized Drums

1. Reflectorized drums shall be plastic and shall meet the applicable requirements of the MUTCD.
2. Reflective sheeting for drums shall meet the requirements of ASTM D4956 and AASHTO M268, and the Flexible High Intensity (H/I) Sheeting for ASTM Type VI and shall be six inches wide.
3. Reflectorized drums are listed on the MassDOT Qualified Construction Materials list.
4. Warning lights shall conform to the MUTCD Type A.
5. The first five drums used for any taper or as designated on the Traffic Management Plan shall be equipped with flashing lights, or as directed by the Owner and/or Engineer.

PART 3 - EXECUTION

3.1. PORTABLE CHANGEABLE MESSAGE SIGN

- A. The changeable message units shall be available for use one week prior to and throughout the duration of the project and be positioned in accordance with the traffic management plans approved by the Owner and/or Engineer for each phase of construction and/or at the direction of the Owner and/or Engineer. The signs shall be visible from a minimum distance of 900 feet with a viewing angle of no less than 30 degrees. The Contractor shall take appropriate measures as needed within the roadway layout to provide the required minimum sight distance. The Contractor shall be responsible for the maintenance of each device and appurtenance. If the unit is found to be defective in any way it shall be replaced immediately at the Contractor's

expense.

3.2. TRAFFIC CONTROL DEVICES

A. Temporary Safety Signing

1. Signs which are damaged or are missing from their locations shall be replaced by the Contractor without additional compensation.
2. All signs shall be maintained in a satisfactory manner including the removal of dirt or road film that causes a reduction in sign retroreflectivity.
3. All signs shall be mounted in compliance with the requirements of the MUTCD.
4. All signs not consistent with the use of the roadway shall be removed, completely covered, or turned away from traffic each day. In no case shall signs or their portable supports be left in the traveled way when the traffic management set-up has been removed.
5. Rollup signs shall only be used for single work shift setups.

B. Arrow Board

1. The arrow board shall be deployed as shown on the approved Traffic Management Plan or as directed. The unit shall be properly maintained throughout its use on the project.

C. Reflectorized Drums

1. Reflectorized drums are to be used as channeling devices in roadway work zones. The first five drums used for any taper or as designated on the Traffic Management Plan shall be equipped with flashing lights.

END OF SECTION 01850

DIVISION 2

SITE WORK

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SECTION 02017

GEOTECHNICAL INSTRUMENTATION AND MONITORING

PART 1 GENERAL

1.1 SUMMARY

- A. This section specifies the geotechnical instrumentation and monitoring requirements for MBTA railroad tracks and embankment, support of excavation (SOE) for jacking and receiving pits, groundwater observation wells, and structures and utilities within 100 feet of construction activities.

1.2 RELATED SECTIONS

- A. Section 02140: Dewatering
- B. Section 02160: Temporary Excavation Support Systems
- C. Section 02200: Earthwork

1.3 DESCRIPTION OF WORK

- A. Provide labor, materials, and equipment necessary to complete the work as specified in this Section, including:
 - 1. Perform pre- and post-construction condition surveys on railroad tracks, structures, and utilities within 100 feet of construction activities.
 - 2. Provide, install, operate, and maintain an optical survey monitoring system to measure vertical and horizontal deformation of the railroad tracks, railroad embankment, and SOE for the jacking and receiving pits.
 - 3. Provide, install, operate, and maintain instrumentation to monitor groundwater elevations in groundwater observation wells.
 - 4. Provide, install, operate, and maintain two vibration monitors (VMs) to measure background vibrations and construction induced vibrations.
 - 5. Collect and report data at the required frequencies, intervals, and formats to the Engineer.
 - 6. Notify the Engineer if a Limiting Value is exceeded.
 - 7. Provide consultation and data interpretation in relation to monitoring equipment, associated readings, and potential site impacts.
- B. Install the instruments under the observation of the Engineer. The Engineer will determine if the installed instruments are acceptable. Immediately replace, at no cost, unsatisfactory instrumentation or instrumentation that is damaged during the project duration.

1.4 QUALIFICATIONS

- A. Geotechnical instrumentation work involves a significant amount of highly specialized tasks. The Contractor shall engage an independent instrumentation subcontractor who

will be responsible for furnishing and installing all geotechnical instrumentation, maintaining and calibrating instrumentation as required, and collecting, reducing, processing, plotting, interpreting, and reporting data to the Engineer. The Contractor's independent instrumentation subcontractor shall meet the qualifications specified herein.

- B. The independent instrumentation subcontractor's staff shall include a qualified Geotechnical Instrumentation Engineer (GIE) who is a registered Professional Engineer in the Commonwealth of Massachusetts, who has a minimum of a Bachelor of Science degree in civil engineering, and who has at least 4 years of direct field experience in installation and monitoring of the types of instruments specified herein. The GIE shall:
1. Prepare detailed step-by-step procedures for all instruments used including installation, data collection, and removal or decommissioning procedures.
 2. Supervise the preparation of submittals, and review and sign all submittals.
 3. Be on site and supervise at least the first two installations of each type of instrument.
 4. Conduct at least the first two activities of each of the following tasks for each instrument specified herein: pre-installation acceptance tests, post-installation acceptance tests, field calibration, data collection, and data reduction, processing, plotting, and interpretation.
- C. If automated motorized total stations (AMTSs) will be used to monitor track monitoring points (TMPs), surface settlement monitoring points (SMPs), or SOE deformation monitoring points (DMPs), the independent instrumentation subcontractor's staff shall include a qualified AMTS Specialist who shall have previous experience in installation, monitoring, and data interpretation of at least 4 AMTS systems in applications similar to those specified herein, including previous experience in active railroad environments. The AMTS Specialist shall perform the following tasks:
1. Detail the overall configuration and appurtenant hardware and installation procedures for the entire AMTS system, including final locations of the components.
 2. Perform pre-installation and post-installation acceptance tests.
 3. Supervise installation of the system in its entirety.
 4. Collect, reduce, process, plot, and evaluate data to prove functionality, and obtain formal initial readings.
 5. The AMTS Specialist may be the GIE if so qualified.
- D. If manual surveying is performed to monitor TMPs, SMPs, or DMPs, the person in responsible charge of the surveyors shall be a Registered Land Surveyor in the Commonwealth of Massachusetts with a minimum of 3 years of experience in deformation measurements of the types and accuracies specified herein. The field survey party chief shall have a minimum of 1 year of experience in deformation survey measurements of the types and accuracies specified herein.
- E. Personnel performing pre- and post-construction condition surveys shall have at least 4 years of experience performing similar surveys for construction-related activities.

Personnel shall be supervised by a Professional Engineer registered in the Commonwealth of Massachusetts.

- F. Acceptance of the Contractor's independent instrumentation subcontractor, including the GIE, the AMTS Specialist, and all other field and office personnel shall be subject to the review of the Engineer. Unqualified personnel will be replaced at no additional cost to the Owner.

1.5 QUALITY ASSURANCE

- A. All equipment shall be approved by the Engineer.
- B. High quality materials, designs, and construction techniques shall be selected to provide robust, corrosion and vibration resistant instruments. Accuracy and dependability of equipment shall be selected considering changes in temperature, humidity, stray currents, or other adverse conditions that may be encountered.
- C. Installation procedures acceptable to the Engineer shall be developed for each type of instrumentation. All instrumentation shall be installed in the presence of the Engineer.

1.6 TOLERANCES

- A. Elevations of TMPs, SMPs, and DMPs shall be determined to an accuracy of ± 0.005 foot.
- B. Horizontal positions of TMPs and DMPs shall be determined to an accuracy of ± 0.01 foot.
- C. Groundwater elevations in groundwater observation wells shall be determined to an accuracy of ± 0.05 foot.

1.7 SUBMITTALS

- A. Construction Conditions Survey Reports
 - 1. Conduct, document, and submit a Pre-Construction Condition Survey Report prior to the start of construction activities covering the railroad tracks and any structure or utility within 100 feet of construction activity.
 - a. The survey will be documented in such a way to allow for comparisons of conditions for future condition surveys. It should include, but not be limited to, HD video/photos, notes, and sketches.
 - 2. Conduct, document, and submit a Post-Construction Condition Survey Report after completion of construction activities for the same structures and in the same manner.
- B. Instrumentation Plan
 - 1. Submit an Instrumentation Plan including the following for review and acceptance by the Engineer at least 30 days prior to the installation of any instruments.
 - a. Personnel qualifications demonstrating compliance with Section 1.04 herein.

- b. Shop drawings and/or written documents listed below, as prepared by qualified specialists submitted above:
 - 1) Installation Plan and Schedule: Full details of the proposed plan and schedule for installing and monitoring instruments including AMTSs (if used), TMPs, SMPs, DMPs, survey reference points, groundwater observation wells, and VMs including proposed locations, types, and installation methods of the instruments. Provide the nomenclature for identifying instruments and the monitoring schedule.
 - 2) Description of methods for installing, protecting, and monitoring all instrumentation including but not limited to AMTSs (if used), TMPs, SMPs, DMPs, survey reference points, groundwater observation wells, and VMs.
 - 3) Location and type of any additional instruments to be installed by the Contractor that are not required by these specifications.
 - c. Product Data: Provide a manufacturer's data sheet for each product.
 - C. Installation Records
 - 1. Within 5 days of installing each instrument, the Contractor shall submit to the Engineer the as-built instrument location, and its corresponding installation record sheet. The installation record sheet shall include, but not be limited to, the installed location of each instrument with instrument identification number, installation date, photograph, established elevation, and initial readings. The Contractor shall also furnish details of installed instruments showing all dimensions and materials used, a separate statement describing installation procedures for each instrument, and as-built drawings of each instrument location.
 - D. Data Reports and Interpretation
 - 1. Submit monitoring reports at the required frequencies on a consistent schedule.
 - a. Baseline Data Reports shall include a minimum of 1 week of data displayed in a plot format. The Baseline Data Report for the TMPs, SMPs, and VMs shall be submitted a minimum of 1 week before installation of the SOE begins. The Baseline Data Report for the groundwater observation wells shall be submitted a minimum of 1 week before dewatering begins. The Baseline Data Report for the DMPs shall be submitted a minimum of 1 week before excavation within the SOE begins.
 - b. Daily Data Reports shall be submitted every morning and include the previous day of TMP and SMP data, notable occurrences, repairs, and Limiting Value exceedances.
 - c. Weekly Data Reports shall be submitted by Tuesday each week and include the previous week of data for all active instruments, notable occurrences, repairs, and Limiting Value exceedances.
 - d. The Final Data Report shall be submitted following the completion of construction and include all data collected during the project. Historical plots, notable occurrences, repairs, and Limiting Value exceedances documented in previous reports shall be combined and a final

- interpretation from the GIE shall be provided, highlighting any condition changes, damages, or concerns related to the railroad tracks.
- e. The GIE shall provide data interpretation services for all submitted data reports and as needed to address any Limiting Value exceedances or questions relating to monitoring data.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Track Monitoring Points (TMPs)
 - 1. TMPs shall be survey prisms for surveys performed with an AMTS or portable total station. TMPs shall be attached to the rails using mechanical fasteners.
- B. Surface Settlement Monitoring Points (SMPs)
 - 1. SMPs shall be survey prisms for surveys performed with an AMTS or portable total station. SMPs shall be attached to the top of a 3/4-inch-diameter steel rod driven a minimum of 5 feet below the embankment surface through a minimum 3-inch-diameter PVC or steel sleeve extending to a depth of 2 feet below the embankment surface.
- C. SOE Deformation Monitoring Points (DMPs)
 - 1. DMPs shall be survey prisms for surveys performed with an AMTS or portable total station. DMPs shall be attached to the SOE piles using mechanical fasteners.
- D. Survey Instruments
 - 1. Survey total stations (AMTS or portable) shall have a minimum angular accuracy of 1.0-arc second (standard deviation in accordance with ISO 17123), and a minimum display reading less than or equal to the accuracy. Distance accuracy shall be 1.0mm±1ppm.
 - 2. AMTSs shall be installed on a bracket or pedestal of sufficient strength and stiffness to avoid impacting the readings. AMTSs shall be equipped with a cellular modem for remote data acquisition.
- E. Vibration Monitors (VMs)
 - 1. Seismographs used for vibration monitoring shall be coupled with a geophone that complies with International Society of Explosives Engineers (ISEE) standards and be designed to continuously monitor peak particle velocity (PPV). The unit shall be capable of a histogram combination mode to automatically download data in the event readings exceed the trigger value and have the following minimum features:
 - a. Seismic range: 0.01 to 4 inches per second with an accuracy of ±5 percent or better at frequencies between 10 Hertz and 100 Hertz, and with a resolution of 0.01 inches per second or less.
 - b. Frequency range: 2 to 250 Hertz.
 - c. Three-component sensor for vibration monitoring.

- d. Two power sources: Internal rechargeable battery and charger and 115-volt AC. Battery must be capable of supplying power to monitor vibrations continuously for up to 24 hours.
- e. Continuous monitoring mode must be capable of recording triaxial peak particle velocities, and frequency of peaks with an interval of one minute or less.
- f. Certification shall be provided to indicate that the seismograph is calibrated and maintained in accordance with the equipment manufacturer's calibration requirements and that, where applicable, calibrations are traceable to the National Institute of Standards and Technology.
- g. Seismographs shall be equipped with a cellular modem to allow remote transmission of data.

PART 3 EXECUTION

3.1 PRE- AND POST-CONSTRUCTION CONDITION SURVEYS

A. Buildings and Utilities

- 1. Perform Pre- and Post-Construction Condition Surveys of all buildings and utilities within 100 feet of the work areas. Condition Survey Reports shall highlight key points of interest and any damage or signs of distress observed. Condition Survey Reports shall be prepared in such a way to allow for comparisons of conditions with future Condition Surveys. Documentation shall include, but not be limited to, HD video/photos, notes, and sketches.

B. Railroad Tracks

- 1. Perform Pre- and Post-Construction Condition Surveys of all railroad tracks within 100 feet of the trenchless crossing. Condition Survey Reports shall highlight conditions of the rails, ties, ballast, and other railroad features. Condition Survey reports shall be prepared in such a way to allow for comparisons of conditions with future Condition Surveys. Documentation shall include, but not be limited to, HD video/photos, notes, and sketches.

3.2 MONITORING POINTS

A. Track Monitoring Points (TMPs)

- 1. Install TMPs a minimum of 1 week before installation of the SOE for the jacking and receiving pits. Install TMPs on each rail above the pipe crossing. Install additional TMPs on each rail spaced at 15.5-foot intervals to a distance of 93 feet from the pipe crossing in both track directions.
- 2. Monitor TMPs for vertical and horizontal movements. Readings may be taken by an AMTS or by a Registered Land Surveyor.
 - a. Take readings at 4-hour intervals (24 hours per day and 7 days per week) starting a minimum of 2 days before installation of the SOE for the jacking and receiving pits begins and continue monitoring a minimum of 2 weeks after the pipe crossing is complete and backfilling

- of the jacking and receiving pits is complete. Use the readings taken before the installation of the SOE begins to establish baseline values.
 - b. Increase frequency of TMP readings to every 1 hour during jacking.
 - c. Take additional readings if requested by the Engineer.
 - 3. Provide readings to the Engineer daily.
- B. Surface Settlement Monitoring Points (SMPs)
 - 1. Install SMPs a minimum of 1 week before installation of the SOE for the jacking and receiving pits. Install 2 SMPs on the railroad embankment along the centerline of the pipe crossing at the midpoints of the embankment between the rails and the jacking and receiving pits.
 - 2. Monitor SMPs for vertical movements. Readings may be taken by an AMTS or by a Registered Land Surveyor.
 - a. Take readings at 4-hour intervals (24 hours per day and 7 days per week) starting a minimum of 2 days before installation of the SOE for the jacking and receiving pits begins and continuing until a minimum of 2 weeks after the pipe crossing is complete and backfilling of the jacking and receiving pits is complete. Use the readings taken before the installation of the SOE begins to establish baseline values.
 - b. Increase frequency of SMP readings to every 1 hour during jacking.
 - c. Take additional readings if requested by the Engineer.
 - 3. Provide readings to the Engineer daily.
- C. SOE Deformation Monitoring Points (DMPs)
 - 1. Once the SOE for the jacking and receiving pits is installed, but before excavation begins, install DMPs on top of or within 1 foot of the top of the SOE. A minimum of 2 DMPs shall be installed on each side of the SOE. Install additional DMPs if requested by the Engineer.
 - 2. Monitor DMPs for horizontal and vertical movements. Readings may be taken by an AMTS or by a Registered Land Surveyor.
 - a. Take a minimum of 3 readings for each DMP prior to the start of excavation to establish baseline values.
 - b. Take a minimum of 2 readings per week for each DMP from the start of excavation until backfilling of the excavation is complete.
 - c. Take additional readings if requested by the Engineer.
 - 3. Provide readings to the Engineer weekly. Readings shall be provided no later than Tuesday of the week following collection of the readings.

3.3 GROUNDWATER OBSERVATION WELLS

- A. Monitor groundwater elevations in the groundwater observation wells.
 - 1. Take a minimum of 1 reading per day for each groundwater observation well during dewatering.
 - 2. Automated data loggers with electronic transducers and cellular modems may be utilized.
 - 3. Take additional readings if requested by the Engineer.
- B. Provide readings to the Engineer weekly. Readings shall be provided no later than Tuesday of the week following collection of the readings.

3.4 VIBRATION MONITORS (VMs)

- A. Install two VMs at locations specified by the Town, MBTA, or Keolis.
- B. Perform vibration monitoring continuously during construction activities. Continuous shall be 15-minute histogram-combo mode operated 24 hours per day every day regardless of construction activity.
 - 1. Perform a minimum of 1 week of continuous monitoring before installation of the SOE for the jacking and receiving pits begins.
 - 2. The VMs shall be set to trigger waveform recording at peak particle velocities of 0.2 inches per second or less.
- C. Relocate VMs if requested by the Town, MBTA, or Keolis.

3.5 LIMITING VALUES

- A. The Contractor shall perform all work in a manner to prevent instrument readings from exceeding the Limiting Values below. MBTA or Keolis may modify these limits at any time during the work. Where the Contractor's operations result in instrumentation readings approaching the Limiting Values below, the Contractor shall modify their means and methods so that the work may be accomplished without exceeding the Limiting Values. Immediately notify the Engineer via email in the event of a Limiting Value exceedance.
 - 1. TMP Limiting Values:
 - a. Vertical: ± 0.25 -inch
 - b. Horizontal: ± 0.25 -inch transverse to track
 - 2. SMP Limiting Values:
 - a. Vertical: ± 0.25 -inch
 - 3. DMP Limiting Values:
 - a. Horizontal: ± 0.50 -inch
 - b. Vertical: ± 0.25 -inch
 - 4. VM Limiting Values:
 - a. 0.50-inch per second

3.6 DATA REDUCTION, PROCESSING, PLOTTING, AND REPORTING

- A. The Contractor's instrumentation subcontractor and surveyors shall reduce, process, plot, and report data from the geotechnical instrumentation and monitoring program.
- B. When data resulting from the geotechnical instrumentation and monitoring program indicate that a Limiting Value has been exceeded, as specified in Section 3.04, the Contractor shall immediately notify the Engineer.
 - 1. Include the monitoring point ID, timestamp, current reading, and data plots.
- C. Each day, the Contractor shall submit to the Engineer an electronic daily data report for the TMPs and SMPs with all new data, as specified herein. The daily data report shall include:
 - 1. A brief description of the cumulative changes in instrument readings, a brief description of the changes in readings from the previous daily data report, and

- a table summarizing actual readings and if any Limiting Values have been exceeded. Plots of data versus time and including key construction activities and other events that could influence changes in the data shall be shown. Plots shall be at the same scale to facilitate graphical comparison.
2. A description of work being performed during the day by the Contractor and any possible activity in the area that may have affected the instrument readings.
- D. Each week the Contractor shall submit to the Engineer an electronic weekly data report with all new data, as specified herein. The weekly data report shall include:
1. A section for each type of instrument. This section shall include a brief description of the cumulative changes in instrument readings, a brief description of the changes in readings from the previous weekly data report, and a table summarizing instruments, actual readings, and if any Limiting Values have been exceeded. Plots of data versus time and including key construction activities and other events that could influence changes in the data shall be shown. Plots of like instruments shall be at the same scale to facilitate graphical comparison.
 2. A description of work being performed during the week by the Contractor and any possible activity in the area that may have affected the instrument readings.
- E. Plots of TMP, SMP, and DMP data shall show absolute vertical and/or horizontal deformation versus time.
- F. Plots of groundwater observation well data shall show groundwater elevation versus time.
- G. Plots of vibration monitoring data shall be histogram plots showing peak particle velocity versus time. If the trigger level is exceeded, additional plots showing peak particle velocity versus frequency and particle velocity versus time for each triggering event shall also be provided.

3.7 DAMAGE TO INSTRUMENTATION

- A. The Contractor shall protect all instruments and appurtenant fixtures, leads, connections, and other components of instrumentation systems from damage due to construction operations, weather, traffic, and vandalism.
- B. If an instrument is damaged or inoperative, including an existing instrument installed by others, the Contractor's instrumentation subcontractor shall repair or replace the damaged or inoperative instrument within 72 hours, at no additional cost to the Town. The Engineer will be the sole judge of whether repair or replacement is required. The Engineer may impose a work stoppage in the vicinity of the damaged or inoperative instrument until it is again operational, at no additional cost to the Town.
- C. The Contractor shall repair or replace at its own cost any of the readout devices used for the Contractor's monitoring program that become damaged, inoperative, or, in the judgment of the Engineer, unreliable.

3.8 REMOVAL OF INSTRUMENTS

- A. The Contractor shall remove all instrumentation installed under this contract and restore the site to the satisfaction of the Engineer and the MBTA. Protect and maintain all instrumentation until such time as written approval authorizing removal of instrumentation has been received from the Engineer.
- B. Removal of instruments shall include removing and disposing of protective covers, and recovery of salvageable portions of instrumentation.
- C. All instruments or portions thereof removed by the Contractor shall remain the property of the Contractor.

END OF SECTION

SECTION 02020

EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies equipment and materials for an erosion and sediment control program for minimizing erosion and siltation during the construction phase of the project. The erosion and sediment control provisions detailed on the Drawings and specified herein are the minimum requirements for replacement of damaged erosion controls. The Contractor shall provide additional erosion and sediment control materials and methods as required to affect the erosion and siltation control principles specified herein.

1.2 RELATED SECTIONS

- A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - 1. Section 01110 – Environmental Protection
 - 2. Section 02200 – Earthwork
 - 3. Section 02950 – Planting

1.3 SUBMITTALS

- A. Proposed methods, materials to be employed, and schedule for effecting erosion and siltation control and preventing erosion damage shall be submitted for approval. Submittals shall include:
 - 1. List of proposed materials including manufacturer's product data.

- B. Samples:

The following samples shall be

submitted: <u>Sample</u>	<u>Size</u>
Coir Log	12 x 12 in.
Coir Mat	12 x 12 in.

1.4 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
1. Massachusetts Department of Public Works, and The Commonwealth of Massachusetts Department of Public Works; Construction Standards.
 2. Massachusetts Department of Environmental Protection, *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas*, May 2003.
 3. Order of Conditions issued by the Weymouth Conservation Commission (Appendix D).
 4. 401 Water Quality Certification issued by the Massachusetts Department of Environmental Protection (Appendix G).

1.5 EROSION CONTROL PRINCIPLES

- A. The following erosion control principles shall apply to the land grading and construction phases:
1. Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion.
 2. Whenever feasible, natural vegetation shall be retained and protected.
 3. Extent of area which is exposed and free of vegetation and duration of its exposure shall be kept within practical limits.
 4. Temporary seeding, mulching, or other suitable stabilization measures shall be used to protect exposed critical areas during prolonged construction or other land disturbance. Prolonged exposure of unstabilized soil shall not exceed 60 days.
 5. Drainage provisions shall accommodate increased runoff resulting from modifications of soil and surface conditions during and after development or disturbance. Such provisions shall be in addition to existing requirements.
 6. Sediment shall be retained on-site.
 7. Existing perimeter erosion control devices and truck wheel wash station shall be properly maintained during clearing and grubbing operations and excavation work. Dewatering sedimentation basin(s) shall be installed prior to dewatering operations.

B. Erosion Protection:

1. Cut and fill slopes and stockpiled materials shall be protected to prevent erosion. Slopes shall be protected with permanent erosion protection when erosion exposure period is expected to be greater than or equal to two months and temporary erosion protection when erosion exposure period is expected to be less than two months.
2. Temporary erosion protection and stabilization shall be accomplished by covering with an erosion protection material, as appropriate for prevailing conditions.
3. Permanent erosion protection shall be accomplished by covering with straw or salt marsh hay and an erosion control mat, and seeding or installation of plantings, as specified in the Contract Documents.
4. Except where specified slope is indicated on Drawings, fill slopes shall be limited to a grade of 3:1 (horizontal: vertical) cut slopes shall be limited to a grade of 2:1.
5. The Contractor shall install erosion and sedimentation controls consisting of wire backed silt fence and coir logs along the upgradient side, downgradient side, and ends of the construction work area within the sewer easement.
6. The erosion control lines will establish the horizontal limits of work between the upland and the resource areas and no work shall be allowed outside of the erosion control lines.
7. All erosion controls shall be removed upon successful completion of the work and stabilization of upland areas.
8. The perimeters of the temporary staging and any construction access points shall also be bounded by erosion and sedimentation controls.
9. Disturbed areas shall be stabilized daily to prevent erosion into the wetland resource areas or surface water bodies.

PART 2 - PRODUCTS

2.1 WIRE BACKED SILT FENCE

- A. Silt fence fabric shall be woven polypropylene geotextile fabric that meets the following physical properties:

	Property	ASTM Test Method	Units	Value
1.	Grab Strength	D4632	lbs	100 (min.)
2.	Permissivity	D4491	sec - 1	0.10 (min.)
3.	Apparent Opening Size	D4751	Sieve #	20-30
4.	Ultraviolet Stability	D4355	%	70 (min.)

- B. Wood stakes shall be 2" by 2" by 3' and shall be spaced no more than 10' apart.
- C. Silt fence shall be wire backed with 14 gauge wire mesh with 2" by 4" openings.
- D. Wire backed silt fence shall be Mutual Industries Wire Back Silt Fence with MISF 1776 Fabric or approved equal.

2.2 COIR LOGS

- A. Logs shall be constructed of coconut coir mattress fiber.
- B. Logs shall have a diameter of 12".
- C. Logs shall have a density of 7 pounds per cubic foot.
- D. Logs shall have a bristle coir twine outer net with 2" by 2" openings and a net strength of 90 lbs (min.).
- E. Logs shall be staked in place with 2" by 2" by 3' wooden stakes.
- F. Logs shall be naturally biodegradable.
- G. Coir logs shall be Rolanka™ BioD-Roll™ 30 L or approved equal.

2.3 COIR MAT

- A. The mats shall be constructed of coconut coir mattress fiber.
- B. The netting material shall be an open weave design that allows for seeding before and after the mat is installed.
- C. The mats shall be suitable for slopes up to 2:1, flows of 8 feet per second, and be able to withstand a shear stress of 2.3 lbs/sf.

- D. Mats shall be designed for temporary erosion control and stabilization for a period of 9 to 24 months.
- E. Mats shall be naturally biodegradable.
- F. Coir mat shall be Control Mat OCF 30 or approved equal.

2.4 STRAW AND HAY

- A. The Contractor shall place down a bed of straw or salt marsh hay to serve as a marker barrier between existing ground surface and any temporary fill materials (e.g. construction mats, crushed stone, rip rap, etc.) within the limits of work of the sewer alignment.
- B. All hay shall be salt marsh hay.
- C. Hay bales for construction of erosion control devices shall be new, firm, bound salt marsh hay bound with biodegradable twine.

2.5 TEMPORARY SEED COVER

- A. If required, seed mixture for temporary cover by hydroseeding application shall conform to the following:

<u>Quantity per 1000 sq. ft. Coverage</u>	<u>Material</u>
27-1/2 lb.	Wood Fiber Mulch
4 lb.	Seed
1/2 lb.	Annual Ryegrass
22 lb.	10-6-4 Fertilizer
69 gal.	Water

- B. For seeded areas, fertilizer shall only be applied outside of the 100-foot buffer zone of all wetlands, streams, ponds, and stormwater detention ponds. Application areas shall be coordinated with the Engineer.
- C. Hydroseeding Equipment:
 1. Hydroseeding equipment may be either portable or truck mounted, with dual agitation, a minimum working volume of 1000 gallons and a minimum spray range of 80 ft.
 2. Hydroseeding equipment must be capable of uniformly applying the slurry mix including wood fiber mulch if required, at the specified rate, and at the required locations.
 3. Hydromulching equipment, either trailer or truck mounted, must be capable of uniformly applying straw or hay mulch at a minimum mulching rate of 8 tons per hour, at a distance of not less than 80 ft.

2.6 FILTER BASKETS

- A. Filter baskets shall be Metal-Era Inlet Baskets, manufactured by Metal-Era Inc., Wukesha, WI 53186, or approved equal. Baskets shall be installed at all catch basins and remain in place until vegetation on the site is stabilized. Filter baskets shall include a nonwoven geotextile filter fabric material with a minimum Grab Strength of 45 lb., Mullen Burst Strength of 60 psi minimum, a minimum permeability of 120 gpm/sq. ft., and an opening no greater than No. 20 U.S. Standard Sieve.

PART 3 - EXECUTION

3.1 WIRE BACKED SILT FENCE

- A. Silt fence shall be constructed and installed as indicated on the Drawings or as necessary to control run-off during contractors' site work operations. Fencing shall be placed in a row with ends overlapping at least 12" of the adjacent section. Fencing shall be trenched a minimum of 4" into the soil. Fencing shall be securely anchored in place by wooden stakes driven at least 12" into the soil. The silt fence shall establish the limits of work within the sewer easement.

3.2 HAY BALE CHECK DAM

- A. Check dams shall be constructed and installed as necessary to control site runoff from stormwater or dewatering operations.

3.3 COIR LOG DIKE

- A. Coir logs shall be constructed and installed as indicated on the Drawings or as necessary to control run-off during contractors' site work operations. Coir logs shall be placed in a row with ends tightly abutting the adjacent wattles. Each wattle shall be embedded in the soil a minimum of 2 in. Straw wattles shall be securely anchored in place by wooden stakes with minimum embedment of 24 inches below trench surface driven through the log. The first stake in each log shall be angled toward the previously laid section to force the wattles together. Stakes shall be placed every 4 feet.

3.4 COIR MAT

- A. Coir mat shall be installed for stabilization of surficial soils within the sewer easement. Mats shall be placed in a row and overlap adjacent mats by a minimum of 12 inches. The edges of the mats shall be trenched into the soil a minimum of 4 inches to be secured.

3.5 HYDROSEEDING

- A. If required for long-term disturbance greater than 60 days, seed for temporary cover shall be spread by the hydroseeding method, utilizing power equipment commonly

used for that purpose. Seed, fertilizer, mulch and water shall be mixed and applied to achieve application quantities specified. Material shall be applied in 2 equal applications, with the equipment during the second pass moving perpendicular to direction employed during the first pass. Hydroseeding shall not be done when it is raining or snowing, or when wind velocity exceeds 5 mph.

- B. If the results of hydroseeding application are unsatisfactory, the mixture and/or application rate and methods shall be modified to achieve the required results.
- C. After the grass has appeared, all areas and parts of areas which fail to show a uniform stand of grass, for any reason whatsoever, shall be reseeded and such areas and parts of areas seeded repeatedly until all areas are covered with a satisfactory growth of grass.

3.6 FILTER BASKETS

- A. Filter baskets shall be installed at all catch basins. Filter baskets shall be installed in accordance with manufacturer's recommendations. Maintain filter baskets as required and as follows. Baskets shall be inspected within 24 hours after each rainfall or daily during extended periods of precipitation. Repairs shall be made immediately, as necessary, to prevent particles from reaching the drainage system. Sediment deposits shall be removed after each storm event or more often if the fabric becomes clogged. Clean clogged fabric and repair or replace damaged filter fabric as necessary.

3.6 MAINTENANCE AND REMOVAL OF EROSION CONTROL DEVICES

- A. Wetland area, water courses, and drainage swales adjacent to construction activities shall be monitored continuously for evidence of silt intrusion and other adverse environmental impacts, which shall be corrected immediately upon discovery.
- B. Culverts and drainage ditches shall be kept clean and clear of obstructions during construction period.
- C. Erosion Control Devices:
 - 1. Sediment behind the erosion control device shall be checked weekly and after heavy rain. Silt shall be removed if greater than 6 in. deep.
 - 2. Condition of erosion control devices shall be checked daily. Damaged and/or deteriorated items shall be replaced. Erosion control devices shall be maintained in place and in effective condition.
 - 3. Hay bales, coir logs, and coir mats shall be inspected frequently and maintained or replaced as required to maintain both their effectiveness and essentially their original condition. Underside of bales and logs shall be kept in close contact with the earth below at all times, as required to prevent water from washing beneath them.

4. Sediment deposits shall be properly disposed of, in a location and manner which will not cause sediment nuisance elsewhere.

D. Removal of Erosion Control Devices

1. Erosion control devices shall be maintained until all disturbed earth has been stabilized and/or vegetated, at which time they shall be removed upon approval from the Engineer and Conservation Commission. After removal, areas disturbed by these devices shall be regraded or seeded as needed.
2. Erosion protection material shall be kept securely anchored until acceptance of the entire Project.

END OF SECTION 02020

SECTION 02050

DEMOLITION, MODIFICATION, AND ABANDONMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish all plant, labor, tools, equipment, materials, and supplies as required for utility and structure removal, demolition, modification, and/or abandonment as specified.
- B. The Work of this Section shall include demolition of, roadway and sidewalk; removal or abandonment in place of existing sewers and appurtenance structures; and demolition.

1.2 DESCRIPTION

- A. The work of this Section includes, but is not limited to, the following:
 - 1. Obtaining all necessary permits, providing necessary notifications, and complying with all local, state, and federal laws regarding safety and demolition.
 - 2. Stockpiling, removal, and legal disposal or recycling of demolished materials. Salvage value accrues to the Contractor.
 - 3. The protection of areas outside the Limits of Work including paved roadways.
 - 4. The protection of utilities which are scheduled to remain.
 - 5. The control of dust.
- B. Refer to the Drawings for additional requirements for demolition.

1.3 SUBMITTALS

- A. The Contractor shall submit the following items:
 - 1. A utility demolition plan which has been fully coordinated with the Owner, that describes the locations, cutting, capping, removal, and disposal of existing utility services, and the maintenance and protection of temporary and permanent services.
 - 2. Disposal receipts from the recycling site or solid waste disposal facility at the completion of the project.

1.4 REPAIR OF DAMAGE

- A. Any damage to existing facilities to remain, as caused by the Contractor's operations shall be repaired at no additional cost to the Owner.
- B. Damaged items that are to remain in place shall be repaired or replaced with new materials as required to restore damaged items or surfaces to a condition equal to and matching that existing prior to damage or start of Work of this Contract.

1.5 PROTECTION OF EXISTING WORK

- A. Before beginning any cutting, trenching or demolition work, the Contractor shall carefully review the work sequence and examine the Drawings and Specifications to determine the extent of the Work. The Contractor shall take all necessary precautions to prevent damage to existing facilities, which are to remain in place, and be responsible for any damage that is caused by the operations. Existing facilities so damaged shall be repaired or replaced to their undamaged condition at no additional cost to the Owner.
- B. The Contractor shall carefully consider all bearing loads and capacities for placement of equipment and material on Site. In the event of any questions as to whether an area to be loaded has adequate bearing capacity, the Contractor shall consult with the Owner prior to the placement of such equipment or material.

1.6 JOB CONDITIONS

- A. The Owner assumes no responsibility for actual condition of the facilities to be removed, abandoned or modified. The Contractor shall visit the Site; inspect all facilities to get familiarized with all existing conditions and utilities.
- B. The Owner may occupy portions of the utilities, structures, properties or other facilities immediately adjacent to demolition area. Conduct demolition, modification and abandonment so Owner's operations will not be disrupted. Provide not less than 24 hour notice to Owner of activities that will affect Owner's operations.
- C. Traffic: Conduct operations and removal of debris to ensure minimum interference with the normal use of public ways and other adjacent facilities. Do not close or obstruct traffic ways, streets, walks, or other used facilities without the written permission of the Owner and authorities having jurisdiction. The Contractor shall coordinate with the Owner to provide access, circulation, vehicle parking, and security to the areas that are to remain. Traffic management shall be performed in accordance with Section 01850 – TRAFFIC MANAGEMENT.
- D. Protection: Prevent injury to persons and damage to abutting property. Provide adequate shoring and bracing to prevent uncontrolled collapse.

- E. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer.
- F. Storage or sale of removed items or materials on-site will not be permitted.
- G. Utilities: Maintain service to all properties connected to portions of Work in this Contract. All above and below grade utilities, other than those scheduled to be removed, abandoned or demolished, shall be supported and protected in accordance with this section.

A. Comply with Section 01400 - QUALITY ASSURANCE.

- ## 1.8 WARRANTY

- ## PART 2 – PRODUCTS

A. Comply with material and installation requirements specified in individual Specification Sections.

A. Coordinate with Engineer and Owner, who will make final determination as to whether an item is to be salvaged or removed. Except for items or materials indicated or determined to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project Site.

A. Use repair materials identical to existing materials. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match

existing adjacent surfaces to the fullest extent possible. Use materials whose installed performance equal or surpasses that of existing materials.

PART 3 – EXECUTION

3.1 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled. Disposal shall be at a recycling facility to the extent possible.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Items so designated are existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- E. Abandon: Items so designated are existing facilities that are not located within the alignment of proposed Work that shall be permanently abandoned in place.

3.2 DEMOLITION AND ABANDONMENT PROCEDURES

- A. Disposal of all materials shall be performed in compliance with applicable local, state, and federal codes and requirements. Provide labor, equipment, and materials to perform Work as specified and indicated.
- B. The Contractor shall flush all pipe and structures to be removed or abandoned to remove solids, wastewater, and other objectionable material prior to commencing demolition, modification, or abandonment.
- C. Existing pipe and structures shall be removed where designated on the Drawings or where necessary to install new pipe or structures. When existing pipe is removed, the Contractor shall plug all resulting abandoned connections whether or not shown. Where removed piping is exposed, the remaining piping shall be fitted with a removable cap or plug, or bulk headed. Where existing pipe is to be abandoned, the Contractor shall cut back the abandoned pipe for a distance of 5 feet from any connecting structures to remain. Pipes to be abandoned in structures to be abandoned may be capped, plugged or bulk headed from inside the structure. All holes at the existing structures shall be repaired.
- D. Where existing structures such as sewer manholes are to be abandoned in place, the Contractor shall remove the frames, grates, covers, and shall remove the top section as required to cut the structures down a minimum of 5 feet below final grade. The

- E. Pipes shall be capped with mechanical joint caps wherever practicable. If required, permanent plugs shall be constructed of Class B concrete, brick and mortar, or other material approved by the Engineer. Brick shall be installed into the pipe to a distance equal to the diameter of the pipe being plugged.
- F. Fill excavations with solid fill resulting from earth removal operations and/or with select borrow material in accordance with Section 02200 – EARTHWORK. Final grade to be restored in kind unless otherwise noted.
- G. Exercise precautions for fire prevention. Make fire extinguishers approved for Class A, B and C fires available at all times in areas where performing demolition or abandonment Work with burning torches. Do not burn demolition debris on Site.

- A. Certain areas of existing piping, conduits, and the like will be affected by Work necessary to complete modifications under this Contract. The Contractor shall be responsible to rehabilitate those areas affected by his construction activities.
- B. When new piping is installed in existing manholes or other structures, the Contractor shall accurately position core-drilled openings in the concrete as shown or otherwise required. Openings shall be of sufficient size to permit a final alignment of pipelines and fittings without deflection of any part and to allow adequate space for satisfactory installation of a flexible connector to ensure water tightness around openings so formed.
- C. When new piping is to be connected to existing piping, the existing piping shall be cut square and ends properly prepared for the connection shown. Any damage to the lining and coating of the existing piping shall be repaired by the Contractor.

- A. The Contractor shall prepare and transport all demolition debris, materials, refuse, and abandoned equipment to an approved disposal site as part of the Work under this Section. All costs associated with the proper performance of this Work shall be borne solely by the Contractor at no additional cost to the Owner.
- B. Storage, handling, disposal and transportation of demolition debris shall be in accordance with Specification Sections 02080.
- C. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. Demolition material shall not be reused as fill. Removal of

demolition debris shall be conducted to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities which shall not be closed or obstructed without permission from the Owner. Alternate routes shall be provided around closed or obstructed traffic ways.

D. Burning: Do not burn demolished materials.

3.5 REPAIR OF DAMAGE

A. Any damage to existing facilities to remain, as caused by the Contractor's operations shall be repaired at no additional cost to the Owner. Damaged items shall be repaired or replaced with new materials as required to restore damaged items or surfaces to a condition equal to and matching that existing prior to damage or start of Work of this Contract.

END OF SECTION 02050

SECTION 02060

TREE PROTECTION AND TRIMMING

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the protection and trimming of trees that interfere with, or are affected by, execution of the Work, whether temporary or new construction. It also covers tree pruning when necessary in the vicinity of the site Work.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS and other DIVISION 1 Specification Sections, apply to this section. Related Sections include the following:
 - 1. Section 02020 – Erosion and Sediment Control

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of engineers and owners, and other information specified.
- C. Certification: From a qualified arborist that trees indicated to remain have been protected during construction according to recognized standards and those trees were promptly and properly treated and repaired when damaged.

1.4 QUALITY ASSURANCE

- A. Tree Service Qualifications: An experienced tree service firm to be consulted as necessary.
- B. Arborist Qualifications: An arborist certified by the International Society of Arboricultural or licensed in the jurisdiction where Project is located, to be consulted as necessary.
- C. Tree Pruning Standards: Comply with ANSI A300, "Trees, Shrubs, and Other Woody Plant Maintenance--Standard Practices," unless more stringent requirements are indicated.
- D. Preinstallation Conference: Conduct conference at Project site prior to start of work.

1. Before starting tree pruning protection and trimming, meet with representatives of authorities having jurisdiction, Owner, Engineer, consultants, and other concerned entities. Review tree pruning protection and trimming procedures and responsibilities. Notify participants at least three working days before convening conference. Record discussions and agreements and furnish a copy to each participant.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Drainage Fill: Selected 2 1/2 inch crushed stone, and with not more than 10 percent passing a 3/4-inch sieve.
- B. Topsoil: Fertile, friable, surface soil, containing natural loam and complying with ASTM D 5268. Provide topsoil that is free of stones larger than 1 inch in any dimension and free of other extraneous or toxic matter harmful to plant growth. Obtain topsoil only from well-drained sites where soil occurs in depth of 4 inches or more; do not obtain from bogs or marshes.
- C. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers, as manufactured by US Fabrics, model # US 120NW or approved equal.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.
- B. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line; prevent soil compaction over root systems.
- C. Do not allow fires under or adjacent to remaining trees or other plants.

3.2 EXCAVATION

- A. Install shoring or other protective support systems to minimize sloping or benching of excavations.
- B. Do not excavate within drip line of trees, unless otherwise indicated.
- C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.

1. Relocate roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and relocate them without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction.
2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.3 REGRADING

- A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by qualified arborist, unless otherwise indicated.
 1. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop.
- B. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.
- C. Moderate Fill: Where existing grade is more than 6 inches, but less than 12 inches, below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade as follows:
 1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of finish grade and extend not less than 18 inches from tree trunk on all sides. For balance of area within drip-line perimeter, place drainage fill up to 6 inches below elevation of grade.
 2. Place filter fabric with edges overlapping 6 inches minimum.
 3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

3.4 TREE PRUNING

- A. Prune remaining trees affected by temporary and new construction as indicated on the plans.
- B. Prune remaining trees, if any, to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by qualified arborist.

- C. Pruning Standards: Prune trees according to ANSI A300.
- D. Cut branches with sharp pruning instruments; do not break or chop.

3.5 TREE REPAIR AND REPLACEMENT

- A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to written instructions of the qualified arborist.
- B. Remove and replace dead and damaged trees that the qualified arborist determines to be incapable of restoring to a normal growth pattern.
 - 1. Provide new trees of the same size and species as those being replaced; plant and maintain as specified.
 - 2. Provide new trees of 6-inch caliper size and of a species selected by Engineer when trees more than 6 inches in caliper size, measured 12 inches above grade, are required to be replaced.
- C. Aerate surface soil, compacted during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch diameter holes a minimum of 12 inches deep at 24 inches (on center). Backfill holes with an equal mix of augered soil and sand.

3.6 DISPOSAL OF WASTE MATERIALS

- A. Burning is not permitted.
- B. Disposal: Remove excess excavated material, displaced trees, roots, stumps and excess chips from Owner's property.

END OF SECTION 02050

SECTION 02080

SOIL AND WASTE MANAGEMENT

PART 1 – GENERAL

1.1 SUMMARY OF WORK

- A. In general, the Work under this Section shall include all labor, materials, equipment, supervision and supplies necessary for the loading, handling, transportation, and stockpiling of Suspect soil; and transportation and off-site disposal of Contaminated and Hazardous soil as directed by the Engineer.
- B. Laboratory testing of soil within the project limit has not been conducted. A review of online records at the MassDEP's website identifies known release sites proximate to the project area. These records may be used to identify areas of Suspect soil.

1.2 QUALIFICATIONS

- A. The Contractor shall demonstrate the necessary skills, experience, training, and qualifications to conduct the work as specified herein.
- B. The Contractor shall possess all required licenses, insurance, permits and trained employees to properly execute the work as specified herein.
- C. All personnel involved in the transportation of waste from the site shall have the required skills, experience, training, and qualifications including, but not limited to, Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) training.

1.3 EXISTING CONDITIONS

- A. The following documents are available for review and appended to these Technical Specifications.
 - 1. Appendix A – Boring Logs and Railroad Crossing Report
- B. The Contractor is obligated to review existing environmental assessment reports and manage the soil and groundwater in accordance with applicable state and federal regulations.

1.4 DEFINITIONS

- A. Asphalt, Brick and Concrete (ABC): Asphalt, Brick and Concrete material that is waste from construction or found in fill material during excavation. ABC material found in clean, reusable fill may be reused onsite to the greatest extent possible. All excess ABC generated during construction shall be disposed of offsite at an appropriate, licensed facility that will accept ABC waste.

- B. Area of Excavation: For the purposes of reusing soil on-site, the *area of excavation* is considered to be the approximate area in which the soil was removed provided that area is consistent in soil strata, color, texture, geotechnical properties and has substantially similar visual and olfactory characteristics. Soil returned to the *area of excavation* shall be returned to approximately the same horizontal and vertical location from which it originated provided that it is not placed in an area that differs substantially in physical or chemical characteristics as can be observed and measured during excavation. Soil returned to the area of excavation shall be placed and compacted as specified in the Contract Specifications.
- C. Authorized Excavation: Earth Excavation or "Excavation" consists of removal of materials encountered to the elevations and widths indicated in the Contract Drawings, Specifications, or as directed by the Engineer.
- D. Background: (see Section 1.3.W.1)
- E. Bill of Lading (BOL): A document signed by a waste transporter or the transporter's representative and issued to a waste generator that evidences the receipt of waste to a specified disposal facility or location. BOL is typically utilized as accompanying documentation during transport of Regulated soils. Soils subject to management under 310 CMR 40.0035.
- F. Competent Person: for purposes of this Specification, the term shall mean one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them [29 CFR 1926.32(f)].
- G. Containerized Waste (as defined in 310 CMR 40.0000) means discarded oil and/or hazardous material at a site in drums, tanks, engineered impoundments, or other fabricated containers, including, without limitation:
 - 1. Discarded oil and/or hazardous material that was generated at a site as a results of manufacturing industrial, commercial, or other process-related activities, and
 - 2. Discarded oil and/or hazardous material discovered, managed, generated, or accumulated as part of a response action.
- H. Contaminated Media:
 - 1. Contaminated Debris (as defined in 310 CMR 40.0000) means any debris that contains oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.
 - 2. Contaminated Groundwater (as defined in 310 CMR 40.0000) means groundwater containing oil and/or hazardous material at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600.
 - 3. Contaminated Sediments (as defined in 310 CMR 40.0000) means sediments containing oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.

4. Contaminated Soil (as defined in 310 CMR 40.0000) means soil containing oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.
5. Contaminated Surface Water (as defined in 310 CMR 40.0000) means surface water containing oil and/or hazardous material associated with a release for which notification is required under 310 CMR 40.0300 and 40.1600.
- I. Debris (as defined in 310 CMR 40.0000) means solid material that is a manufactured object, plant or animal matter that is intended for disposal or is otherwise no longer serving its intended use. The term shall include demolition and construction waste, hay, vegetation, and other organic and inorganic absorbent materials used to contain or absorb releases of oil and/or hazardous material. The term shall not include:
 1. Any material for which a specific treatment standard is provided in 40 CFR Part 268, Subpart D; or
 2. Process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges or air emission residues.
- J. Demolition and Construction Waste (as defined in 310 CMR 40.0000) means any waste materials and rubble resulting from the construction, remodeling, repair or demolition of buildings, pavement, roads or other structures. Demolition and construction waste includes, but is not limited to, concrete, bricks, lumber, masonry, road paving materials, rebar and plaster.
- K. Disposal shall mean safe and legal reuse, recycling, or disposal off the site in a manner as required to comply with all applicable statutes and regulations.
- L. Hazardous Material as defined 310 CMR 40.0006.
- M. Hazardous Waste:
 1. Hazardous waste as defined 310 CMR 40.0006; or
 2. Hazardous waste as defined in 40 CFR 261.3.
 3. A waste, or combination of wastes, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may:
 - a. Cause or significantly contribute to an increase in mortality or cause or significantly contribute to an increase in a serious irreversible or incapacitating reversible illness; or
 - b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.
- N. Licensed Site Professional and LSP (as defined in 310 CMR 40.0006) each means a hazardous waste site cleanup professional, as defined in M.G.L. c.21A, §19, holding a valid license issued by the Board of Registration of Hazardous Waste Site Cleanup Professionals pursuant to M.G.L. c.21A, §§19 through 19J.

- O. Liquid Waste: materials generated onsite due to work performed and are waste or excess including but not limited to collected groundwater, collected stormwater, non-aqueous phase liquids, Contractor-supplied fuels and fluids, and drummed liquids.
- P. Material Shipping Record (MSR): A document signed by a waste transporter or the transporter's representative and issued to an acceptance facility that evidences that receipt of unregulated soils or waste to a specified disposal facility or location. For the shipment of contaminated soil, urban fill, and dredge materials not subject to management under 310 CMR 40.0035.
- Q. Massachusetts Contingency Plan or MCP: 310 CMR 40.0000
- R. Natural Soils: Natural soil is defined for the purposes of the Contract as unconsolidated sand, gravel, silt and clay, and the organic material which has become part of the unconsolidated soil matrix. For this section only, soil may include broken and fragmented rock.
- S. Peat: A substance of vegetable origin, consisting of roots and fibers, moss, etc., in various stages of decomposition, and found, as a kind of turf or bog. Peat shall be considered natural soil when it is encountered in small amounts (layers 1-foot (304.8 mm) or less in thickness) and when it is impractical to separate the peat from the natural soil or urban fill strata. Otherwise, peat shall be considered a distinctive stratum.
- T. Regulated Soil: Soils requiring management in accordance with 310 CMR 40.0000, and require BOL to document transport. (see Section 1.3.W.3)
- U. Remediation Waste: as defined in 310 CMR 40.0006 means any Uncontainerized Waste, Contaminated Media, and/or Contaminated Debris that is managed pursuant to 10 CMR 40.0030. Remediation Waste does not include Containerized Waste.
- V. Solid Waste (Waste): materials generated on site due to work performed and are waste or excess, including but not limited to asphalt, brick and concrete (ABC) waste, demolition waste, decontamination waste, dredging spoils (dewatered), metal waste, plaster/drywall, plastic waste, rock, rubber waste, sediment, tar waste, trash, vegetation debris, wood waste.
- W. Soil Classification Categories: Unless specifically stated otherwise, terms used in this specification are as defined in the Massachusetts Contingency Plan (MCP), 310 CMR 40.0006. The following definitions and soil classifications apply to these specifications:
 - 1. Background or Unregulated Soil: Any fill or natural soil material which meets the regulatory definition of "background" as defined in 310 CMR 40.0006 may be reused as common fill/ordinary borrow provided it also meets the physical requirements as specified herein and as specified in Section 02200 – Earthwork. Suitable soil which does not have any evidence of contamination may be reused within the area of excavation without first performing laboratory analyses. For record keeping purposes soil/fill that meet the definition of background, shall be transported under a Material Shipping Record (MSR). Background means those levels of oil and hazardous material that would exist in the absence of an MCP Disposal Site, including both Natural Background and Anthropogenic Background.

Background soil may also be re-used off-site without restriction provided it is reused in an area where background concentrations are equal to or greater than the site-specific background determined at the off-site location in accordance with DEP Policy WSC#13-500 Similar Soils Provision Guidance (or most recent update). The Contractor is responsible for determining the background levels at the point of excavation. It is also the Contractor's responsibility to identify one or more disposal facilities/locations with background levels appropriate to receive the material to be disposed or reused. It is the Contractor's responsibility to determine these background levels in advance so as to comply with 310 CMR 40.0032(3)(b) and so as not to delay or adversely affect construction operations.

2. **Impacted:** Any soil or fill material which contains oil or hazardous materials (OHM) at concentrations greater than background levels but less than release notification thresholds established by 310 CMR 40.0300 and 40.1600. Impacted soil may be reused in the area of excavation or as fill provided it is reused in an area of equal or greater contamination and meets the physical requirements as specified herein and as specified in Section 02210 - Earth Excavation, Backfill, Fill and Grading. Impacted soils requiring off-site transportation and disposal/reuse shall be transported using a Material Shipping Record (MSR).
3. **Contaminated or Regulated Soils:** Any soil or fill material which contains oil or hazardous materials at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600, except where the presence of the material is consistent with the regulatory definition of "background" as defined in 310 CMR 40.0006.

Any soils which contain either petroleum or chemical odor or visual indications of oil or hazardous materials shall be handled as potentially contaminated soils. Soil/fill that may be contaminated shall be set aside by the Contractor for assessment by the Contractor's environmental professional (LSP) in a secure manner to prevent exposure to humans and the environment and in accordance with 310 CMR 40.0036. Soil/fill that is staged and characterized can be reused within the area of excavation or elsewhere on site provided the material has been tested and has equal or less contamination than the point where it is to be reused and it is not reused beneath a permanent structure such as a building foundation. Any excavated soil/fill material not reused within the area of excavation must be characterized prior to off-site reuse/disposal. After analytical results are available, soil/fill shall be handled in accordance with the type and degree of contamination (if any) present in the soil/fill, and recommendations of the Contractor's LSP.

Contaminated soil that cannot be reused on site shall be reused off-site, recycled, or disposed as a solid waste at an appropriately permitted facility unless it also meets the regulatory definition of hazardous waste as defined in 40 CFR Part 261 or contains detectable asbestos. Contaminated soils requiring off-site transportation and reuse/disposal or recycling shall be transported using a Material Shipping Record (MSR) or Bill of Lading (BOL), as appropriate. Subcategories of Contaminated soil are defined as follows:

- a. Unlined Landfill Material: Soils that meet all applicable criteria (i.e., COMM 97-001 and/or facility-specific permit requirements) for off-site reuse as daily cover, intermediate cover, or pre-cap contouring material at in-state unlined

landfills. Note: per COMM 97-001, sediments may not be re-used as Unlined Landfill Material.

- b. Lined Landfill Material: Soils that meet all applicable criteria (i.e., COMM 97-001 and/or facility-specific permit requirements) for off-site reuse as daily cover, intermediate cover, or pre-cap contouring material at in-state lined landfills.
 - c. Asphalt Batch Plant Material: Soils that meet all applicable criteria for recycling at an asphalt batching plant and/or the specific licensing requirements for the proposed recycling facility. Soil that does not meet the applicable COMM 97-001 criteria for Unlined or Lined Landfill Material that is characterized by the following: TPH concentrations in excess of 5,000 milligrams per kilogram (mg/kg), or total SVOC concentrations in excess of 100 mg/kg, or total non-chlorinated VOC concentrations in excess of 10 mg/kg, and total lead concentrations below 3,000 mg/kg and TCLP metal concentrations below applicable hazardous levels. Material classified as Asphalt Batch Plant Material shall be excavated and transported to an asphalt batch plant for recycling. This material cannot be used as daily cover at or disposed of at a Massachusetts Unlined or Lined Landfill.
 - d. Out-of-State Non-Hazardous: Soils that contain concentrations of contaminants that exceed in-state lined and unlined landfill reuse criteria as well as asphalt batch plant acceptance criteria, but meet the criteria for regional thermal treatment facilities or out-of-state recycling facilities, and are not classified as a Resource Conservation and Recovery Act (RCRA) Hazardous Waste.
4. Hazardous Waste: A waste, or combination of wastes, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause or significantly contribute to an increase in mortality or cause or significantly contribute to an increase in a serious irreversible or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Also included within the definition of hazardous waste is hazardous waste as defined 310 CMR 40.0006 and 40.CFR 261.3. Hazardous waste as defined in 40 CFR 261.3 is a solid waste that exhibits any of the characteristics of hazardous waste in excess of regulation levels presented in 40 CFR 261, subpart C and/or that is listed in 40 CFR 261, subpart D; that is a mixture of solid and hazardous waste; or that is derived from a listed waste. Subcategories of Class C soils shall be as follows:
- a. Post-treatment Non-Hazardous: Soils classified as hazardous waste that have been treated on-site to reduce the toxicity characteristic (e.g., for TCLP lead).
 - b. Hazardous: Material determined to contain "listed" or "characteristic" hazardous waste constituents which cannot be readily treated on-site. This material must be transported to an out-of-state approved RCRA Subtitle C hazardous waste disposal or treatment facility under a Uniform Hazardous Waste Manifest.

- X. Special Waste: Any waste that is determined not to be a hazardous waste pursuant to 310 CMR 30.000 and that exists in such quantity or in such chemical or physical state, or any combination thereof, so that particular management controls are required to prevent an adverse impact from the collection, transport, transfer, storage, processing, treatment or disposal of the waste. Asbestos and PCB-contaminated soils/fill are examples of special waste categories. See Specification Section 02700 for Asbestos Cement Pipe requirements.
- Y. Transportation Documentation or Shipping documentation means the document used to identify and accompany soil or waste during transport such as a Material Shipping Record (MSR), Bill of Lading (BOL), or Uniform Hazardous Waste Manifest. Also referred to as a shipping record.
- Z. Unauthorized Over Excavation: Consists of removal of materials beyond indicated elevations and width limits indicated in the Contract Documents without direction of the Engineer. Over-excavation material handling, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Over-excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer
- AA. Unauthorized Excavation: Consists of removal of materials beyond indicated sub-grade elevations or Contract-defined limits as shown in the Contract documents without specific direction of the Engineer. Unauthorized excavation, handling material, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Unauthorized excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer.
- BB. Unknown Materials: Any material, that is not readily identifiable as nonhazardous waste, and which has not been previously characterized or encountered during site investigation activities. The Unknown Material classification is to be used in the event that an unexpected, unusual material is encountered for which special handling procedures shall be required in order to handle the material safely. Such wastes include but are not limited to:
1. Unlabelled drums or containers containing material which is not readily identifiable as a non-hazardous substance.
 2. Any material, which varies significantly from material previously observed on site and which cannot be readily identified as a nonhazardous.
 3. Waste material of unusual color or odor or material with indications of hazardous levels (e.g. exceeding OSHA permissible exposure limits) of contaminants as evidenced on an organic vapor monitor or other similar instrument.

The Owner reserves the right to apply generator knowledge to classify and profile the material as a previously encountered waste or as a known waste. In the event that a material is encountered which the Contractor is uncertain as to its nature, the Owner or their representative shall assess the material with the Contractor and inform the Contractor as to the nature of the material (known or unknown).

- CC. Unregulated Soil: (see Section 1.3.W.1)

- DD. Urban Fill: Fill, also known as urban, or miscellaneous fill, is defined as a mixture of soil and other materials which have been located in the area through man-made processes primarily for the purpose of grading, backfilling or filling in low areas. Material commonly associated with urban fill includes, but are not limited to; coal, glass, brick, ash, wood fragments and other similar granular materials. Urban fill shall not include boulders, ledge, consolidated rock, asphalt, concrete, railroad timbers, rail, cobblestones or any other abandoned building materials.
- EE. Waste Manifests: the hazardous waste shipping/transportation documentation required to ship all hazardous waste and subject to provisions in 49 CFR 172 Subpart C.

1.5 DESCRIPTION OF WORK

A. General

1. This Section includes furnishing all labor, equipment, materials, and incidentals required to perform all operations in connection with the handling and disposition, stockpiling, transport, in-project reuse and/or off-site reuse or disposal of excess excavated materials resulting from the construction operations as specified. In-project reuse shall be defined as material that is reused within the Project, such as approved use of excavated soils as backfill into the excavation trench after installation of new utilities.
2. This Section includes proper handling and management of waste materials, including, but not limited to, construction debris, building demolition, municipal waste, boulders, regulated and unregulated soils, ash, rubble, asphalt, brick and concrete (ABC), asbestos containing material, asbestos cement pipe (Section 02700), hazardous materials and empty or crushed drums and/or drum parts.
3. Coordinate work with that of all other trades or contracts affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.
4. All work shall be conducted in compliance with Contractor-prepared plans as specified in Paragraph 1.7 Submittals of this Section.
5. Implementation of the submitted HASP and other applicable includes establishing work zones (e.g., support zone, contamination reduction zone, exclusion zone), preparing a decontamination pad(s) and staging area(s), performing the appropriate environmental monitoring, training and medical monitoring of personnel, coordinating waste disposal and waste characterization as needed, etc.
6. The Contractor shall develop, implement, maintain, supervise, and be responsible for all soil management practices during the course of this contract. An OSHA Competent Person, with demonstrated experience in clean and contaminated soil and hazardous waste handling (e.g. L.S.P.), shall be present during all excavation, backfilling, field screening, segregating, handling, and characterization of all soils excavated in the course of completing this contract to ensure that soil is managed in accordance with applicable laws, regulations, and this Section.
7. Demobilizing the site, including, but not limited to, removing and disposing of excess or waste soils, rock, solid waste, demolition waste, construction-related equipment and materials used for personnel and equipment decontamination and

related waste such as personal protective equipment (PPE), decontamination water/solids, temporary covers, and wash-water storage tanks; disconnection of temporary utilities; and final clean-up to pre-construction conditions.

8. The Contractor is responsible for being aware of potential hazards at the site and reviewing all existing information which provides evidence of contamination within the limit of the work.

B. Soil and Waste Management

1. This Section describes the general parameters and requirements for testing (including field screening and laboratory chemical analysis), excavation, handling, storage, tracking, transport, and in-project reuse or off-site reuse/disposal of soils.
2. In the course of the work, it may be necessary to excavate and handle potentially contaminated soil or hazardous material. The soil or hazardous materials management practices specified herein apply to all soil and/or hazardous materials excavated during the course of this Contract. Contaminated soils and hazardous materials/hazardous waste shall be managed in accordance with 310 CMR 40.0000 and 310 CMR 30.000.
3. The Contractor shall segregate soils during excavation and stockpiling to avoid mixing soils (i.e. topsoil, fill and natural soils shall be segregated, in addition to regulated, unregulated soils, etc.).
4. Characterization of soil, and unknown material for disposal/off-site reuse purposes; field screening and soil management/segregation; temporary storage/staging; and characterization (as may be necessary for unknown materials and/or for compliance with receiving facility requirements); and disposal and/or off-site reuse of excavated soil and waste material. All laboratory chemical analyses conducted shall utilize currently accepted U.S. EPA and applicable state agency analytical protocols and procedures.
5. The Contractor shall characterize all excavated and stockpiled soil and fill material prior to off-site reuse or disposal. Characterization requirements may vary depending on the source/location of the excavated soil/fill, the site selected to receive soil suitable for off-site reuse, or the disposal facility permits and policies. The Contractor is responsible for final waste characterization and shall determine if any additional waste characterization is required at no additional cost to the Owner.
6. Providing and constructing a secure soil staging area sized to adequately segregate soils in accordance with the conditions specified without impeding construction-related activities. The Contractor is to use existing information and obtain additional information as may be needed to minimize the need for a staging area. If a staging area is required to characterize unknown or excess material for any reason, the Contractor is responsible for locating, selecting, preparing and securing the area.
7. Excavated soil/fill that is contaminated or may be suspected as contaminated or containing hazardous materials shall be stockpiled and covered prior to characterization and off-site reuse or disposal. Since individual disposal facilities will have different permit conditions and specific pre-characterization data requirements the Contractor is responsible for final soil characterization prior to

transport and disposal. The Contractor is hereby made aware that for the purposes of disposal, final soil characterization is the responsibility of the Contractor and costs for securing a staging area and conducting waste characterization shall be incorporated into the Contractor's bid price for construction.

8. During construction activities, excavated soil/fill waste shall be field-screened by the Contractor and either loaded directly for off-site disposal (provided the excavated material is consistent with previously conducted investigations) or stockpiled in a soil/fill waste staging area located by the Contractor and approved by the Owner and Engineer. Stockpiles of soils shall be minimized to reduce the amount of waste material stored onsite. Stockpiled materials that are to be disposed of shall remain onsite for only as long as it would reasonably take to characterize (if not done in advance), load and transport offsite to an approved disposal facility. Soils that are to be re-used as fill material shall be stockpiled and maintained per Section 3.4 Staging Areas.
9. Soil suspected of having the characteristics of a hazardous waste or of containing a listed hazardous waste shall not be removed from the excavation except at the direction of the Engineer.
10. Soil/fill waste shall not be staged within 100 feet (30.5 meters) of a reservoir, wetland or Area of Critical Environmental Concern or in a 100-year floodplain. Soil/fill waste shall not be staged in the work area over night. Contaminated material requiring additional waste characterization due to waste disposal facility requirements or in order to assess unknown materials, shall be staged securely pending analytical sampling and characterization by the Contractor.
11. The Contractor shall reuse excavated soil at the point of origin to the maximum degree possible. Soil/fill which cannot be reused immediately at the point of origin shall either have been pre-characterized for off-site reuse or disposal by the Contractor and directly loaded for off-site transport (provided the excavated soil/fill is consistent in visual, olfactory and field screening characteristics with subsurface investigation conducted prior to construction pursuant to the MCP) or it shall be staged at a location determined and secured by the Contractor pending analytical characterization.
12. Excavating soil, fill and waste containing potential asbestos-containing material (e.g., transite board) shall conform to Section 02700 – Asbestos-Cement Pipe Removal and Disposal. No off-site staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner.
13. Removing characterized on-site materials for off-site re-use or disposal.
14. Placing and grading of certified clean fill (including fill from on-site which is determined to be suitable for re-use). The Contractor is to maximize the in-project reuse of on-site materials by using soil suitable for such reuse prior to importing material on site.
15. In the event that a previously uncharacterized, unknown material is encountered the Contractor shall manage the material separately and will temporarily stage the material pending characterization as specified herein.

16. All Investigation Derived Wastes are the property and responsibility of the Contractor and are to be disposed of by the Contractor under a Uniform Hazardous Waste Manifest, Material Shipping Record or by a Bill of Lading, as appropriate. The parties understand and agree that any consultant or sub-consultant (at any tier) is not, and has no responsibility as, a generator, treater, storer, transporter, or disposer of hazardous or toxic substances found or identified at the project site, and that the Contractor agrees to assume responsibility for and indemnify and hold any consultant or sub-consultant (at any tier) harmless from the foregoing.

C. Groundwater Management

1. Management of contaminated groundwater: If groundwater potentially impacted by oil and/or hazardous material (OHM), based on visual or olfactory evidence, is encountered in the course of the work, construction dewatering and discharge permits and groundwater treatment may be necessary depending upon the discharge method(s) and/or location(s) utilized by the Contractor. The Owner and Engineer shall be notified by the Contractor if groundwater potentially impacted by OHM is identified. Refer to Section 02140 – Dewatering and Discharge.

1.6 RELATED WORK

- A. Section 01024 - Measurement and Payment
- B. Section 01350 - Health and Safety Plan
- C. Section 01500 - Temporary Facilities and Controls
- D. Section 02040 – Demolition, Modification, and Abandonment
- E. Section 02140 – Dewatering and Discharge
- F. Section 02220 – Earthwork
- G. Section 02700– Asbestos Cement Pipe Removal and Disposal

1.7 REFERENCES

- A. All work at the site must be performed in accordance with all applicable federal, state, and local regulations, permits and licenses. Comply with applicable requirements of the following standards and those referenced in this Section. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
- B. OSHA regulations (including, but not limited to, 29 CFR 1910.1000, 29 CFR 1926, and CFR 1910.120), 40-hour Occupational Safety and Health Administration (OSHA) training (plus 8-hour refresher training) and all other applicable state and federal regulations regarding health and safety requirements;
- C. The applicable parts of the Code of Federal Regulation (CFR) Title 40: Protection of Environment, pertaining to the Comprehensive Environmental Response and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA),

- RCRA, and the National Emission Standards for Hazardous Air Pollutants (NESHAPS) as regulated by the U.S. Environmental Protection Agency (U.S. EPA);
- D. Massachusetts Site Assignment Regulations for Solid Waste Facility Regulations 310 CMR 16.000.
 - E. Massachusetts Solid Waste Management Facility Regulations 310 CMR 19.00.
 - F. State regulations specified in the Massachusetts Contingency Plan (MCP) (310 CMR 40.0000), and Massachusetts General Law 21E - Massachusetts Oil and Hazardous Materials Release Prevention and Response Act, and applicable Massachusetts Department of Environmental Protection (MassDEP) guidelines and policies;
 - 1. Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup Policy No. WSC-94-400 entitled "Interim Remediation Waste Management Policy for Petroleum Contaminated Soils," dated April 21, 1994.
 - 2. Massachusetts Department of Environmental Protection Bureau of Waste Prevention Policy No. COMM-97-001 entitled "Reuse and Disposal of Contaminated Soils at Massachusetts Landfills," dated August 15, 1997.
 - 3. Massachusetts Department of Environmental Protection, Bureau of Waste Prevention Policy No. WSC#-13-500 "Similar Soils Provision Guidance," dated September 4, 2013.
 - 4. Massachusetts Department of Environmental Protection, Policy #COMM-15-01 "Interim Policy on the Re-Use of Soil for Large Reclamation Projects," dated August 28, 2015.
 - 5. MassDEP Technical Update. Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil (2002);
 - G. Department of Transportation (DOT) regulations 49 CFR, and state transportation licenses and permits;
 - H. NIOSH/OSHA/USCG/EPA: "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" October 1985, DHHS (NIOSH). Publ. No. 85-1 15;
 - I. Department of Transportation training;
 - J. U.S. Army Corps of Engineers 404 permit;
 - K. General Contractor's license;
 - L. National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) to discharge and associated general permits;
 - M. Massachusetts Water Resources Authority pretreatment and construction dewatering requirements and permits;
 - N. Excavation and/or grading permits;

- O. Special use permits;
- P. Special waste haulers certificate;
- Q. Massachusetts Wetlands Protection Act and associated Order of Conditions;
- R. Town of Plymouth wetland regulations and bylaws; and The Contractor's Soil and Waste Management Plan (SWMP) and Health and Safety Plan to protect the workers and the public.

1.8 SUBMITTALS

- A. The Contractor shall prepare a Work Plan that generally describes the work to be performed under 02080 Part 3 (Execution). The work plan shall include, but not be limited to detailing the submittal and implementation of the following:
 - 1. Soil and Waste Management Plan;
 - a. Dust, Vapor and Odor Control Plan;
 - b. Air Monitoring Plan;
 - c. Equipment and Personnel Decontamination Plan
 - 2. Site-Specific Health and Safety Plan (See Section 01350);
 - 3. Dewatering Plan (See Section 02140);
 - 4. Stormwater Handling Plan;
 - 5. Spill and Discharge Control Plan;
 - 6. Asbestos Management Plan (See Section 02700); and
 - 7. MCP required reports as necessary (RAM, URAM, status reports, closure reports).

The Soil and Waste Management Plan (S/WMP) shall be submitted at least three weeks prior to the beginning of any intrusive work at the site. All other required plans shall be submitted to the Owner or Engineer and/or their representative for review and approval at least two weeks prior to beginning any intrusive work at the site. Plans shall be consolidated provided the requirements of each plan are fully incorporated therein.

- B. Soil and Waste Management Plan (S/WMP): The S/WMP shall outline measures for sampling, field screening, laboratory analysis, and disposal/ off-site reuse of soils and wastes generated at the Project site. At a minimum, this plan shall address the following:
 - 1. Methods, procedures, and equipment used for excavating, characterizing, segregating, reusing/backfilling, loading, and transporting contaminated soil/solid waste materials encountered during excavation operations;
 - 2. A list of all transporters and receiving facilities, complete with license numbers, permit numbers (as appropriate), contact person, and address and telephone number that the Contractor utilizes for soil management and waste disposal. In addition, a copy of a memorandum of understanding between the Contractor and each disposal facility shall be attached to the Soil and Waste Management Plan. The

memorandum of understanding shall detail that the disposal facility agrees to accept a specified quantity of waste as characterized in the contract specifications and detail what if any restrictions may apply. The Contractor shall provide copies of the permits held by each disposal facility which the Contractor plans to use to dispose of non-hazardous solid waste, hazardous waste, PCB-impacted waste and asbestos-containing waste. The transporters shall have adequate financial insurance and liability insurance mechanisms to handle any accidents, and associated third-party compensation;

3. A summary of the history of compliance actions for each receiving facility proposed to be used by the Contractor. The compliance history shall include a comprehensive list of any state or federal citations, notices of non-compliance, consent decrees or violations relative to the management of waste (including remediation waste) at the facility. The Owner reserves the right to reject any facility on the basis of poor compliance history;
4. If hazardous wastes are to be transported, Contractor shall have or obtain a valid EPA identification number to transport hazardous materials and any other permits or licenses as required by federal, state and local laws, regulations, ordinances and procedures.
5. Procedures for securing the staging area, controlling dust and soil/solid waste migration, preventing damage to uncontaminated areas via contaminant migration and for decontaminating vehicles and personnel exiting the staging area;
6. The means and methods for decontaminating all equipment and personnel, including provisions for installing an equipment decontamination pad if required or specified.
7. Means, methods and equipment for locating and protecting stockpiles.
8. Methods and procedures for identifying stockpiled material (e.g., labeling, marking containers) and procedures for identification and tracking;
9. Methods, procedures, and equipment used for obtaining the necessary information needed to satisfy the off-site reuse/disposal facility requirements specified herein and/or by the facility;
10. Methods, procedures, and equipment proposed for assessing and handling Unknown Materials. The S/WMP shall indicate which laboratory(ies) the Contractor shall utilize for chemical analysis of soil, groundwater and unknown materials.
 - a. An Unknown Materials information sheet shall be developed as part of the Contractor's S/WMP, upon which the Contractor shall record information such as container type, size, and condition; and, any identifying characteristics of the unknown material. The format of the information sheet shall be as accepted by the Owner and/or its representatives;
 - b. The Contractor's plan for notifying the Owner and Engineer in the event that an unknown material as defined in this specification is encountered. The plan shall include the phone numbers and names of the Owner's representative(s) that the Contractor would contact in such an event.

11. Provisions for separation of incompatible materials and segregation of different class of soil;
12. Procedures for consolidating (i.e., bulking) compatible materials for disposal.
13. Procedures for dewatering as well as handling, characterization, storing, treating and disposing of groundwater due to dewatering. Refer to Section 02140 – Dewatering and Discharge.
14. Procedures for diverting and handling site stormwater. This would include handling, treatment and discharge of storm water.
15. Provisions, procedures and equipment used for control of dust, vapor and odor; including measures to control objectionable dust, vapors, and odors originating from the site (Section 3.7). This shall describe procedures to minimize the creation of dust, and the control of objectionable vapors and odors originating from the site.
16. Provisions, procedures and equipment used to monitor air at the site (Section 3.6). This shall include site specific monitoring for potential hazards in the air; including the proposed instrument(s) to be used, the expected hazards (e.g., dust, VOCs), the monitoring frequency, the monitoring locations, and the reporting procedures.

C. Soil Management/Tracking Documentation:

Prior to off-site disposal or reuse, the Contractor shall provide to the Engineer a letter from the disposal facility indicating that the facility has reviewed the available data relative to the soil/solid waste to be delivered and agrees that the soil/solid waste meets their acceptance criteria. The letter shall be signed by a duly authorized representative of the receiving facility.

Within the time constraints established in state and/or Federal laws and regulations, the Contractor shall submit to appropriate authority(ies) and the Owner, as applicable, Uniform Hazardous Waste Manifests, Material Shipping Records, and/or Bills of Lading (collectively referred to as transportation documentation) for all soils, rock, ACB, asbestos pipe, asbestos containing materials (ACM), hazardous waste and waste disposed or reused off-site utilizing such documents. Copies of all transportation documentation and all other documents used to track and/or permit off-site transportation of soils or wastes shall be submitted to the Owner and Engineer within ten (10) days of shipment. All transportation documentation shall be signed by the transporter and receiving/disposal facility. The Contractor is responsible for preparation of all transportation documentation, manifests, Bills of Lading, Material Shipping Records, and all other related documents completely and accurately prior to submitting them to the Owner and/or its representative for generator and LSP signatures. The Contractor shall be responsible for submitting to the Owner's LSP all information necessary for preparation of LSP opinion letters to disposal facilities and coordinating disposal documentation with all parties. The Owner's LSP and the Owner shall sign any MassDEP Bill of Lading forms where required only after the Contractor has provided the information required for preparation of electronic MassDEP forms. The Contractor shall be responsible for paying for any and all fines associated with inaccurate, incorrect, or improperly completed transportation documentation and all other related documents, including fines resulting from late or untimely submittals.

D. Stormwater Handling Plan

The Stormwater handling plan shall provide provisions to ensure compliance with Section 3.10, other portions of the Contract Documents, and all applicable local, state and federal permits.

E. Quality Control Plan

The Contractor shall prepare a Quality Control plan for the development, implementation, and maintenance of a quality control system to ensure that the specified quality is achieved for all materials and work performed.

- F. Spill and Discharge Control Plan (SDCP): The SDCP shall provide contingency measures and reporting responsibilities for potential uncontrolled spills and discharges of contaminated and/or hazardous materials, including, but not limited to: fuels, oils, contaminated groundwater, granular solid waste, leachate, decontamination water, sewage, and other on-site waste materials. In addition to the above listed items, the SDCP shall specifically contain: procedures for containing dry and liquid spills; absorbent material available on site; storage of spilled materials; governmental reporting (i.e., notification) procedures; decontamination procedures; discharges of sanitary or combined sewers into storm drains either by flow handling/bypassing or accidental or unintentional discharge; and procedures for protecting wetlands and surrounding public and private property.

The Spill and Discharge Plan shall indicate the location and quantity of the materials to be staged on site and the basis for the quantities (i.e. indicate the vessel which will be on site containing the greatest volume of oil or hazardous materials). No fuel or oil tanks or drums may be temporarily staged on site unless they are stored within a secondary containment system. Fuel deliveries shall be performed in a designated area which has either secondary spill containment or an impervious surface with absorbent berms located around the point of fuel delivery. The Spill and Discharge Plan shall indicate the location of the fueling area and the nature of secondary containment which the Contractor intends on utilizing.

1. Notification Procedures: The Contractor shall prepare in advance of work activities a notification list, complete with phone numbers, addresses, and contact names for all parties to be notified in the event of a spill. This list shall be posted on-site at all times and shall include:
 - a. Owner's designated representatives;
 - b. Owner;
 - c. Fire Department;
 - d. Engineer;
 - e. Massachusetts Department of Environmental Protection (as required per 310 CMR 40.0000). The Owner shall be notified immediately of an uncontrolled spill or discharge. If human health or the environment are potentially threatened, the Contractor shall take immediate action to abate the conditions and notify emergency personnel;

- f. Appropriate emergency personnel.
- 2. Spill Incident Report(s): In the event of an uncontrolled spill or discharge, a written report detailing each uncontrolled spill or discharge shall include, at a minimum, the cause and resolution of incident, outside agencies involved, and date and time of occurrence. The report shall be submitted to the Owner within 48 hours of the incident. The Contractor shall document all spills on the as-built Drawings and submit the Drawings to the Owner at project completion. The Contractor shall be responsible for remediating any spills or releases of oil or hazardous materials as a result of the Contractor's activities. The site shall be remediated to pre-release conditions at no additional cost to the Owner.
- G. Medical surveillance records, OSHA 40-hour training forms, accident forms, and all other documentation requirements of the Contractor's safety and health program for personnel working on the site (who are subject to exposure to potentially contaminated soil) shall be up-to-date and kept on file at the site. The Contractor shall provide documentation of employee status upon request of the Engineer and/or their representative.

PART 2 - PRODUCTS

2.1 DUST CONTROL

- A. Dust suppression may be achieved by applying controlled amounts of water or dust suppression chemicals to the project site, and through covering of soil stockpiles, etc. Dust suppression shall be carried out in accordance with the approved SWMP.

2.2 SPILL CONTROL

- A. At a minimum, the Contractor shall maintain on-site absorbent pads, booms and absorbent materials in sufficient quantity to address a release of fuel oil, hydraulic oil or other OHM that the Contractor intends to use or store on site, including fuel oil and hydraulic oil that is used within earth moving equipment. The quantity of spill containment materials maintained on site shall be sufficient to respond to a catastrophic release from the vessel containing the greatest quantity of oil or hazardous material on-site.

2.3 SOIL MANAGEMENT/TRACKING DOCUMENTATION

- A. Provide completed Bills of Lading (BOLs), Material Shipping Records (MSRs), manifests, certificates of disposal, weight slips and all other documentation relative to disposal, reuse, treatment, recycling or other means of off-site use of soil and waste materials.
- B. Provide appropriate equipment and materials to protect and delineate stockpiles as necessary.

PART 3 - EXECUTION

3.1 GENERAL

- A. All work in this section will be performed in accordance with the Contractor's Work Plan, S/WMP, Site-Specific HASP and any other site specific plans/reports that have been approved by the Owner and Engineer.
- B. The primary concern of the Contractor in the excavating, handling, sampling, bulking, and on-site storage of soil/solid waste and/or drummed material (if encountered) will be to protect the health and safety of the site workers, the public, and the environment.
- C. The Contractor shall keep a copy of the Health and Safety Plan (HASP) on site during all operations and shall conduct daily health and safety meetings. Failure to keep a copy of the HASP on-site, or any other breach of the Contractor's Plan, may be cause for stopping work at the cost of the Contractor. Delays caused by the Contractor's failure to comply with the health and safety regulations or any health and safety plan shall not entitle the Contractor to recover any additional costs or time lost. The Contractor shall not be allowed to resume activities until corrective measures are accepted by the Engineer and/or their representative and implemented.
- D. The Contractor shall reuse geotechnically suitable excavated material prior to using imported backfill to reduce the volume of material to be reused/disposed off-site. Imported backfill shall be used only as accepted by the Engineer. Urban fill soils and roadway base/subbase shall be re-used to the maximum extent before reusing naturally occurring soils. If off-site disposal is required, natural soils shall be preferentially disposed or reused. Contamination shall not be exacerbated as a result work activities.

3.2 SOIL/FILL WASTE CHARACTERIZATION

Soil and fill material shall be classified based on the criteria established in the accepted SWMP.

- A. Initial Characterization of Soil/Fill Waste Material: A summary of existing conditions and investigation findings performed by the Engineer during design, including a summary of analytical results, shall be available to the Contractor.
- B. The Contractor shall review all the existing conditions information supplied by others. The Contractor shall use the information and shall either perform independent sampling and characterization of soil/fill waste strata to be encountered during construction in advance of excavation such that excavated soil or wastes can be segregated and directly transported to an appropriate facility or the Contractor shall make the necessary arrangements to secure a staging area(s) suitable for storing soil stockpiles or wastes pending analyses, at no additional cost to the Owner. No staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner. The Contractor shall identify known or suspected areas where hazardous materials may be encountered, including but not limited to asbestos, PCB, lead-based paint.

- C. Soil shall be preliminarily segregated based on the Soil Classification Categories detailed in Section 1., except as indicated below.
1. Potential Asbestos Containing Material (PACM). If soil/fill waste suspected of containing asbestos is encountered during excavation, the Contractor shall immediately contact the Engineer to discuss the nature and extent of the PACM and to assess potential hazards and appropriate handling procedures. Prior to handling and removing the PACM, MassDEP shall be contacted for approval. Discovery and management of PACM shall be documented in the S/WMP. Evidence of PACM includes but is not limited to the presence of suspect asbestos-containing building debris such as cementitious (transite) piping, vinyl floor tiling, roofing paper or paper-like insulation materials or any other suspect asbestos containing material observed in the soil/fill waste. Following MassDEP approval, such soil/fill waste shall be segregated and stockpiled pending confirmatory analysis to determine appropriate disposal requirements.
 2. Unknown Material. If unknown material is encountered during excavation, the Contractor shall immediately contact the Owner and Owner's representative to discuss the nature and extent of the unknown material and to assess potential hazards and appropriate handling procedures. Prior to handling and removing the unknown material from the excavation area, the Contractor and Owner and/or its representatives, shall visually assess the material and its potential hazards. Drums shall be assessed to determine whether they are leaking, corroded, pitted, bulging (evidence of reactive waste), crushed, empty, filled-in-place. Crushed, empty, and/or skeletal parts of drums shall be handled as solid waste, as specified. Note any evidence of staining or olfactory indications of contamination. The Contractor shall record any identification or markings on the drummed material(s). Discovery and management of unknown materials shall be documented as required in the SWMP.
- D. Final Waste Characterization: Final waste characterization shall be the responsibility of the Contractor. The Contractor shall be responsible for determining the characterization requirements of each disposal facility in advance to facilitate timely off-site removal and to adequately estimate the disposal costs. The Contractor shall perform additional segregation based on disposal requirements. Disposal or off-site reuse of the material shall depend on sampling and characterization analytical results. At the request of the Engineer or Owner, the Contractor shall provide a split sample. The Contractor shall perform or observe all sampling and shall provide notice in advance to the Engineer so that the Engineer may observe the sampling procedure.

Stockpiles within the staging area shall be sampled and characterized within a timely manner so as not to impede construction activities or preclude the reuse of soil/fill on site. If soil/fill cannot be reused on site due to the Contractor's delay in sampling material, the Contractor shall dispose of the soil/fill at no additional cost to the Owner including the additional cost of imported fill material used in its place to meet project requirements.

3.3 SOIL/SOLIDS WASTE MANAGEMENT

- A. The Contractor shall reuse, recycle or dispose of all excess soil and wastes resulting from excavation activities in accordance with federal, state and local regulations and these specifications, as well as all other state laws through which the waste material is being transported.
- B. The Contractor shall obtain receipts of disposal for disposed wastes as applicable.
- C. The Contractor shall be responsible for preparing and keeping in proper order all waste manifests, BOLs, MSRs, and shall designate one person who shall be made available to sign all transportation documentation. The Contractor shall be responsible for obtaining the generator's signature and all other signatures required for the proper completion of the transportation documentation. The Contractor shall allow a minimum of five (5) working days from the date of the submittal for any documents requiring the signature of the Owner and/or the LSP. The transportation documentation shall document the handling of the excess excavated soil or waste from the time it is generated until the time it is properly reused or disposed.
- D. The Contractor shall be responsible for obtaining all federal, state, and local permits and variances to allow transport of materials and wastes on public roadways.
- E. Transportation of wastes shall be in compliance with any relevant federal, state and local requirements, and such as to assure that waste material is not released during transit.
- F. Soil and fill material that is managed under a Utility-Related Abatement Measure (URAM) Plan pursuant to the MCP, and which is staged off-site may be re-used within fourteen (14) calendar days of excavation. Any material which is suitable for re-use as ordinary borrow, based on analytical results and could have been placed on site, but was not, due to Contractor delay (i.e. analytical results were not available within 10 days following excavation) will be disposed in accordance with the applicable regulations by the Contractor at no cost to the Owner.
- G. Soil and fill material that is managed under a URAM Plan pursuant to the MCP, which is staged off-site and which is determined at the staging area to be characteristically hazardous may be treated (stabilized) within the "Area of Contamination" only and must be reused within 14 days or disposed of within ninety (90) calendar days of excavation. No treatment may occur at the staging area. Pursuant to the MCP and RCRA, hazardous Remediation Waste (e.g., Hazardous soils) shall be removed from the site within 90 days. All other Remediation Waste (e.g., Contaminated soils) shall be removed within 120 days unless exceptions identified at 310 CMR 40.0031(7) apply.
- H. Contaminated and Hazardous excavated soils shall be completely covered and secured in accordance with this. Soils exhibiting evidence of potential contamination including but not limited to odors and/or staining shall be covered prior to characterization and off-site reuse or disposal.

- I. The Contractor shall be responsible to inform the Owner if hazardous waste disposal will not be performed within 90 days of hazardous waste characterization. This notification shall take place a minimum of 30 days prior to the 90-day deadline. No hazardous waste stockpiled at the site shall remain on site more than 90 days after it is characterized. In accordance with 310 CMR 40.0031, all other Remediation Waste shall not remain on site or temporary off-site storage location more than 120 days from initial date of generation.
- J. Transporters of solid wastes that include, but are not limited to, contaminated soil/fill (including OHM-contaminated soil), construction and demolition debris non-hazardous laboratory wastes, bottles, tires, metal parts, tree stumps, brush, and grass cuttings will utilize trucks or dumpsters specifically designed to ensure that material, dust, or liquid is not released in transit. No truck shall be allowed to exit the site until all free liquids are drained from soil being transported off-site. Moisture content of the soil/waste shall be reduced by the Contractor, to or below the maximum acceptance limits required by the disposal facility. Material shall be covered at all times. The vehicle in which the waste is transported shall be driven directly to the intended destination without any stops or detours in between, except those necessary in response to road conditions, vehicle service needs, or emergencies. Discharge or release of material during transport shall be immediately reported to the Owner. Transporters shall clean up any discharge that occurs in transit, at the Contractor's expense.
- K. Manifesting of solid waste shall be required and shall include at a minimum: vehicle identification; date of loading and disposal; tonnage, as measured at the disposal site; and signature of the Owner and/or its representative, transporter, and disposal facility's representative. Transportation of the wastes shall be accompanied by the appropriate manifests such as a MassDEP Bill of Lading, as required in the Code of Massachusetts Regulations (CMR) 310 CMR 40.0030, a Material Shipping Record or by a Uniform Hazardous Waste Manifest. The original shall be returned to the Owner, and/or their representative, within ten (10) working days of disposal.

3.4 STAGING AREAS AND STOCKPILING

- A. Prior to disposal, the Contractor shall maintain segregated excess excavated soil and waste stockpiles in conformance with all applicable federal, state and local waste disposal regulations. No staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner.
- B. The Contractor's staging area shall be large enough to store equipment, materials and all stockpiled soils. The Contractor shall protect the staging area from contamination due to excavating, handling, storing and disposing of hazardous materials.
- C. Stockpiled soils determined to be Contaminated or Hazardous, as described herein, shall be securely covered at the close of each day and continuously when not being added to or otherwise being handled by the Contractor. Stockpiles shall also be covered at times as directed by the Engineer.
- D. Stockpiles of soils that are known or suspected to be hazardous within the soil staging areas shall be placed on a 20-mil HDPE liner/filter fabric and bermed to minimize the

potential for contamination release. Each soil category shall be staged in separate areas with barriers to keep different soil types from mixing. Waste characterized as RCRA hazardous waste or other Hazardous soils shall not be stored on site for a period greater than ninety (90) days. All other waste, including Unregulated or Contaminated soils, must be disposed of off-site within 120 days of excavation. At the end of each working day, contaminated soils will be covered with 10-mil polyethylene to minimize the potential for release of contaminants.

- E. Covers on stockpiles of soils that are known or suspected to be hazardous shall be secured with tires, ropes, anchors or equivalent material. The cover system shall be capable of resisting actual wind gusts at the site, with a minimum wind capacity of 40 miles per hour. The stockpile covers shall be installed and secured at the end of each working day and at all times when earthwork is not taking place on site. Stockpile covers shall be immediately re-covered should wind forces expose any of the excavated materials. Failure to adequately protect the stockpiles may result in non-payment.
- F. Stockpiles are to be segregated based on visual, olfactory, and field screening results. Similar material may be stockpiled together. Each stockpile must be clearly separated from adjacent stockpiles.
- G. Stockpiles will be clearly designated by a sign post or marker which can be cross-referenced with samples collected from the pile for characterization purposes. The signs/markers are not to be moved, except by authorized personnel and not until the soil is ready to be either reused on site or loaded for off-site disposal.
- H. Unknown, potentially hazardous soils/debris and drummed materials encountered during the project shall be located in a separate bermed location. The Contractor's Soil and Waste Management Plan shall provide construction details of the dimensions and protective measures proposed for the staging area(s). The construction details and protective measures are subject to the approval of the Owner and/or its representatives. The Contractor shall select the area to facilitate handling of the material and to minimize interference with other ongoing construction activities. The Owner or Engineer must agree with the location prior to construction. In the event that excavation is conducted near storm water drainage basins or inlet manholes, the Contractor must protect the drainage structures with filter fabric or provide similar protection to prevent sediment loading and migration of contaminated soils and sediments.
- I. If the soil storage area consists of an unimproved or otherwise pervious surface, and soil to be stockpiled is known or suspected to be contaminated, the Contractor shall install a lining of 6-mil (or greater) polyethylene, to protect the soil from the potential of intermixing with existing subsurface soils.
- J. Stockpiles shall be no greater than 250 cubic yards in volume. If space constraints, etc. make it infeasible to maintain separate stockpiles of soils to 250 cubic yards, the Waste Management Plan shall include a map with the locations of the composite samples for each stockpile shall be provided to the Resident Engineer prior to the submittal of the samples to the off-site analytical laboratory. This will allow any portion of the stockpile, which came back as contaminated soil to be properly segregated and managed separately

- K. Stockpiles shall be established and maintained as per EPA requirements under the Construction General Permit Section 2.1.2.4. Requirements include the following.
- a. Locate the piles outside of any natural buffers and physically separated from other storm water controls;
 - b. Protect from contact with storm water (including run-on) using a temporary perimeter sediment barrier;
 - c. For all soils, provide cover or appropriate temporary stabilization to minimize sediment discharge and to contain and securely protect from wind; nevertheless, the Contractor shall provide cover for any stockpiles containing contaminated soils as specified herein;
 - d. Do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any storm water conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water; and
 - e. Unless infeasible, contain and securely protect from wind.

3.5 HAZARDOUS WASTES

- A. Transporters of hazardous wastes shall be in conformance with Code of Federal Regulations (CFR) 40 CFR, Part 171, all other federal laws and regulations and 310 CMR 30.400, and all other state laws through whose boundaries the waste material is being transported. The transporter shall provide copies of its EPA identification number, Massachusetts transporter's license, and proof of driver training in transporting hazardous waste.
- B. The disposal site shall be in conformance with 40 CFR, Part 264 and relevant laws of the state in which the facility is located. The Contractor shall provide copies of the disposal facility's EPA and state treatment and disposal permit.
- C. Manifesting of hazardous wastes shall be in conformance with 40 CFR, Part 264, Subpart E, 310 CMR 30.310 and 310 CMR 30.405.
- D. Actual quantities which are subject to unit rates shall be tabulated by the Contractor and verified by the Engineer on a daily basis. The Contractor shall not be reimbursed for unit rate work performed without the prior approval of quantities by the Engineer.

3.6 EQUIPMENT AND PERSONNEL DECONTAMINATION

- A. Equipment and personnel decontamination facilities shall be provided by the Contractor when hazardous materials are expected to be encountered and handled onsite. Equipment and personnel decontamination area(s), conforming with the Contractor's HASP and these Specifications, will be constructed in such a manner to protect existing site surfaces, materials, and structures from contamination. The equipment decontamination area(s) will be sized adequately to provide for the decontamination of the largest piece of equipment to be decontaminated. Filter fabric will be placed over an impermeable liner to protect the liner from rips, punctures, or tears from traffic and heavy equipment.

- B. The Contractor shall establish a site-specific decontamination protocol and decontamination areas for personnel and equipment utilized at the subject site. Personnel and equipment decontamination shall be conducted in compliance with the HASP.
- C. The decontamination protocol shall include (i) the means, methods, and materials for the proposed decontamination procedures; (ii) the procedures employed to contain and store the wash or rinse liquids/sludges; (iii) procedures used to sample, analyze, and characterize the contaminated wash or rinse liquids/sludges; (iv) procedures to contain or clean contaminated equipment and PPE; and (v) the procedures for handling and disposing of solid wastes generated from site decontamination activities. All sample analysis shall be completed by a certified laboratory. The Contractor shall be responsible for the cost of this analytical work. The Contractor shall submit a copy of the analytical results and laboratory certifications to the Owner for review prior to proceeding with disposal. The Contractor shall be responsible to properly manifest and dispose of all residual wastes generated from on-site activities in conformance with federal, state, and local environmental and transportation regulations. The Contractor shall be responsible for the manifests and procedures to be used to package and dispose of contaminated solid wastes, wash, or rinse liquids at an EPA or state-approved treatment or disposal facility. The Contractor shall be responsible for any releases from site or decontamination activities due to its work, and will remediate any release for which the Contractor is responsible to pre-existing conditions at the Contractor's expense.
- D. Provisions for collecting decontamination water will be incorporated into the maintenance of the decontamination pad and will include placing an impermeable liner over a sloped surface such that water is directed, if necessary, into an area for subsequent pumping to 55-gallon drums or other appropriate tankage. Following completion of the work, the wash water shall be characterized by the Contractor and disposed off-site, in accordance with federal, state, and local regulations.

3.7 ENVIRONMENTAL FIELD MONITORING / DUST CONTROL

- A. The air monitoring program is to be designed to protect public health and the environment from the potential generation of dust and contaminant release during work. All personnel shall be made aware of the potential hazards and be informed of air monitoring information by the Contractor.
- B. Dust control measures shall be implemented by the Contractor during all soil handling operations, loading and transport of waste material from the site in accordance with the Contractor's Dust Control Plan.
- C. Air monitoring shall occur when excavating or handling soils that are known or suspected to be hazardous or contain OHM. The Contractor shall keep accurate documentation of all air monitoring, which will be made available to the Engineer or Owner upon request.
 - 1. At a minimum, the air monitoring shall include daily monitoring and documentation of one upwind, and two downwind conditions during periods of activity on the site and when there is a potential for dust being generated on the

site. The air monitoring information including air monitoring in the vicinity of all site activities shall also be utilized for establishing levels of personal protection measures in the Contractor's Site Specific Health and Safety Plan. The Contractor shall submit his/her air quality monitoring program for review and approval prior to commencement of site activities.

2. Air monitoring shall include headspace analyses in a jar or plastic bag performed using a portable photoionization detector or other appropriate instrument for the anticipated conditions. The Contractor shall be responsible for properly calibrating the instrument each day and recording the calibration in a daily log which shall include the following information:
 - a. Name of device or instrument calibrated.
 - b. Date of calibration.
 - c. Results of calibration.
 - d. Name of person performing the calibration.
 - e. Identification of the calibration gas.
 3. The Contractor is responsible for providing fully charged instrument(s) at the start of each work day.
 4. When applicable, field screening samples shall be taken from numerous locations within the excavation. Samples shall be taken from any area that appears to be visibly contaminated or where an odor is noted.
- D. If there are indications of contamination, the frequency of air monitoring will be determined by an Industrial Hygienist or competent environmental health professional. The Contractor's Site Health and Safety Officer and Superintendent will be responsible for assuring that monitoring is conducted in an appropriate manner, and that work practices, engineering controls and/or Personal Protective Equipment are proper for the conditions.
- E. Dust shall be controlled during excavation of soil/fill waste material to limit potential spread of contaminants and potential exposure of contaminants to workers and the public.
- F. During construction, real-time dust monitoring shall be conducted under windy and/or excessively dry working conditions or when directed by the Engineer. The monitoring shall consist of total dust testing using MIE, INC. MINIRAM PDM-3 DUST MONITORS, or like instruments. The total dust criteria at the site shall conform to the requirements of the HASP. Should fugitive dust quantities exceed 20 percent of the ambient level or action levels indicated within the HASP, the Contractor shall perform additional measures to reduce the total dust concentrations.
- G. Nuisance dust levels shall be reduced by pre-wetting the surface soils and by establishing and maintaining clean access roads. The Contractor's Dust, Vapor, and Odor Control Plan shall describe the procedures and materials to minimize dust. At a minimum, the Contractor shall provide clean water, free from salt, oil, and other deleterious materials.

- H. Areas of exposed earth to be excavated shall be lightly sprayed with water before excavation if there is potential for nuisance dust generation. Additional water spray may be utilized only when any indication of excessive dust is observed. To the extent feasible, the Contractor shall minimize the use of water within the limits of excavation.
- I. Unimproved access roads shall be sprayed with water on a regular basis to minimize the generation of dust.
- J. All containers temporarily storing waste material shall be covered at all times except as necessary to place waste material into the container. The Contractor shall monitor the covers daily to ensure the covers are in place and effectively eliminating the generation of dust and make appropriate notes in the site log.

3.8 VAPOR AND ODOR CONTROL

The Contractor shall provide the materials and labor to control objectionable vapors and odor in accordance with the Contractor's SWMP. The Contractor shall limit the exposure area and shall cover the exposure area with synthetic reusable covers, lime, foam suppressants, or other methods to reduce off-site odors to acceptable levels. The Contractor shall not use soil suitable for on-site reuse as cover to control vapor and odors.

3.9 BULKING

Following characterization and compatibility testing of waste material, the Contractor shall place compatible materials into common containers to reduce transport and disposal costs, when practicable and with the approval of the Engineer. In addition, materials that are improperly contained shall be transferred into the appropriate containers. Drums and containers used during this project shall meet the appropriate DOT, OSHA, and U.S. EPA regulations for the materials contained. The Contractor shall describe the bulking procedures in the Soil and Waste Management Plan.

3.10 CONTAMINATED LIQUIDS

The Contractor shall collect and properly dispose of contaminated liquids and other liquids generated or encountered on site during construction. Contaminated liquid sources include decontamination water, and drummed liquids encountered during excavation. The Contractor shall be responsible for treating and disposing of contaminated groundwater as required by applicable regulations and Section 02140 – Dewatering and Discharge.

3.11 STORMWATER CONTROL

The Contractor shall protect all work from erosion while onsite. The Contractor shall divert all stormwater from work areas that may contain oil or hazardous materials (OHM). Stormwater that may contact OHM, polychlorinated biphenyls (PCBs), lead, asbestos or other types of impacted soil shall be collected within the immediate area of the contact, treated (as determined by sampling and testing) and disposed of in accordance with all local, state and federal regulations. Stormwater that is collected, stored onsite and sampled shall be tested and characterized for determining proper transportation, disposal and/or discharge in accordance with Section 02140 – Dewatering.

3.12 BACKFILLING AND COMPACTION

Excavated areas shall be backfilled with appropriate backfill material (including excavated material suitable for reuse and, when necessary, imported off-site material) as specified in SECTION 02220 - Earthwork.

3.13 CLEANUP

During the course of the work, the Contractor shall keep the Site and his operations clean and neat at all times. He shall dispose of all residue resulting from the site clearing operations; and at the conclusion for the day's Work, he shall remove and haul away any surplus materials, lumber, equipment, temporary structures, and any other refuse remaining from the site clearing operations and shall leave the entire site in a neat and orderly condition.

Sample Waste Stream Disposal Summary Table

Material Type	Pre-Approval by Receiving Facility	Testing/ Analysis	Transportation Documentation	Proposed Receiving Facility/Facilities
Asbestos Containing Material (ACM)	Required	Not required	WSR	
Asbestos Cement Pipe (ACP)	Required	Not required	WSR	
Unregulated Soils	Required	Required	MSR	
Impacted/Regulated Soils	Required	Required	BOL	
Hazardous materials	Required	Required	HWSM	
Catch basin cleanings	Required	Required	WSR	
Street Sweepings	Required	Not required	WSR	
Contaminated Dewatering liquids	Required	Required	BOL	
Uncontaminated dewatering liquids	Required	Not required	Not required	
Sanitary Sewerage	Not required	Not required	Not required	
Asphalt, Brick and Concrete Material (ABC)	Not required	Not required	MSR, MassDEP notification form if crushed	
Construction Debris	Not required	Not required	Not required	
Vegetation	Not required	Not required	Not required	
Municipal Solid Waste	Not required	Not required	Not required	
Recyclable Materials	Not required	Not required	Not required	

END OF SECTION 02080

SECTION 02101

SITE INVESTIGATION

PART 1 – GENERAL

1.1 SITE CONDITIONS

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 02101

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SECTION 02160

TEMPORARY EXCAVATION SUPPORT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Design, furnish and install temporary excavation support systems as required to maintain lateral support, prevent loss of ground, limit soil movements to acceptable limits and protect from damage existing and proposed improvements including, but not limited to, pipelines, utilities, structures, roadways, and other facilities.
2. Common types of excavation support system include, but are not limited to: singular or multiple stages comprised of cantilevered or internally braced soldier piles and lagging, steel sheetpile wall, timber sheetpile wall, trench box, or combinations thereof. Trench box temporary excavation support system is only acceptable for pipe or utility trench excavations. Temporary unsupported open cut excavation with stable sloping sides is allowed where applicable.
3. Wherever the word "sheeting" is used in this section or on the contract drawings, it shall be in reference to any type of excavation support system specified except trench box.
4. Construction of the temporary excavation support systems shall not disturb the existing structures or the completed proposed structures. Damage to such structures shall be repaired by the Contractor at no additional cost to the Owner.
5. The Contractor shall bear the entire cost and responsibility of correcting any failure, damages, subsidence, upheaval or cave-ins as a result of improper installation, maintenance or design of the temporary excavation support systems. The Contractor shall pay for all claims, costs and damages that arise as a result of the work performed at no additional cost to the Owner.

1.2 RELATED SECTIONS

A. Drawings and general provisions of DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS and other DIVISION 1 Specification Sections, apply to this section. Related Sections include the following:

1. Section 02140 – Dewatering
2. Section 02200 – Earthwork

1.3

SUBMITTALS

A. Shop Drawing: Submit the following in accordance with Section 01300 - SUBMITTALS:

1. Submit the following qualifications four (4) weeks prior to the construction:
 - a. Qualifications of Contractor's temporary excavation support system designer as specified in Paragraph 1.4 D.
 - b. Qualifications of Contractor's temporary excavation support system installer as specified in Paragraph 1.4 E.
 - c. Qualifications of Contractor's independent tieback testing laboratory as specified in Paragraph 1.4 F, if a tieback system is utilized.
 - d. Qualifications of Contractor's temporary excavation support system installation supervisor as specified in Paragraph 1.4 G.
2. Submit a temporary excavation support plan stamped and signed by a Massachusetts Registered Professional Engineer at least two weeks prior to start of the construction. Do not submit design calculations. The review will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy and safety of the means, methods and sequencing of construction. The plan shall include the following items as a minimum:
 - a. Proposed temporary excavation support system(s), details, location, layout, depths, extent of different types of support relative to existing features and the permanent structures to be constructed, and methods and sequence of installation and removal.
 - b. Certificate of Design: Refer to Section 01300 for form.
 - c. If utilizing a tieback system, include tieback installation procedures and criteria for acceptance of tiebacks for performance and proof tests. Submit the tieback testing results to the Engineer for information only.
 - d. Requirements of dewatering during the construction, per Section 02140.
 - e. Minimum lateral distance from the edge of the excavation support system for use for vehicles, construction equipment, and stockpiled construction and excavated materials.
 - f. List of equipment used for installing the excavation support systems.
 - g. A plan to monitor movements of the ground adjacent to excavation support systems and adjacent structures. The plan shall include, but not be limited to locations, details and monitoring schedule of geotechnical instruments such as survey markers (reference points on structures).

- h. Contingency plan if during the course of construction slopes or coastal bank areas area experiencing erosion or deemed vulnerable to erosion or slumping.
- 3. Submit a Construction Contingency Plan specifying the methods and procedures to maintain temporary excavation support system stability if the allowable movement of the adjacent ground and adjacent structures is exceeded. A Contingency Plan shall also be required if during the course of construction slopes or coastal bank areas are experiencing erosion or deemed vulnerable to erosion or slumping. Conservation Commission shall review contingency plan for coast bank stabilization issues.
- 4. For excavation support systems left in place, submit the following as-built information prior to backfilling and covering the excavation support systems:
 - a. Survey locations of the temporary excavation support systems', including coordinates of the ends and points of change in direction.
 - b. Type of the temporary excavation support system.
 - c. Elevations of top and bottom of the excavation support systems left in place.

1.4 QUALITY ASSURANCE

- A. Provide in accordance with Section 01400 and as specified.
- B. Conform to the requirements of the OSHA Standards and Interpretations: "Part 1926 Subpart P - Excavation, Trenching, and Shoring", and all other applicable laws, regulations, rules, and codes.
- C. All welding shall be performed in accordance with AWS D1.1.
- D. Prepare design, including calculations and drawings, under the direction of a Professional Engineer registered in Massachusetts and having the following qualifications:
 - 1. Not less than ten (10) years experience in the design of specific temporary excavation support systems to be used.
 - 2. Completed not less than five (5) successful temporary excavation support system projects of equal type, size, and complexity within the last five (5) years.
- E. Temporary Excavation Support System Installer's Qualifications:
 - 1. Not less than three (3) years experience in the installation of similar types and equal complexity as the proposed system.
 - 2. Completed not less than three (3) successful excavation support systems of similar type and equal complexity as the proposed system.

- F. If utilizing a tieback system, employ an independent testing laboratory to test the tieback system with the following qualifications:
 - 1. Be accredited by the American Association of State Highway and Transportation Officials (AASHTO) Accreditation Program.
 - 2. Employ personnel conducting testing who are trained in the methods and procedures to test and monitor tieback systems of similar type and equal complexity, as the proposed system.
 - 3. Have not less than five (5) years experience in testing of tieback systems of similar type and equal complexity as the proposed system.
 - 4. Have successfully tested at least three (3) tieback systems of similar type and equal complexity as the proposed system.
- G. Install all temporary excavation support systems under the supervision of a supervisor having the following qualifications:
 - 1. Not less than five (5) years experience in installation of systems of similar type and equal complexity as the proposed system.
 - 2. Completed at least five (5) successful temporary excavation support systems of similar type and equal complexity as the proposed system.

1.5 DESIGN CRITERIA

- A. Design of temporary excavation support systems shall meet the following minimum requirements:
 - 1. Support systems shall be designed for earth pressures, hydrostatic pressure, equipment, temporary stockpiles, construction loads, and other surcharge loads.
 - 2. Design a bracing system to provide sufficient reaction to maintain stability.
 - 3. Limit movement of ground adjacent to the excavation support system to be within the allowable ground deformation as specified.
 - 4. Design the embedment depth below bottom of excavation to minimize lateral and vertical earth movements and provide bottom stability. Toe of braced temporary excavation support systems shall not be less than 5 feet below the bottom of the excavation.
 - 5. Design temporary excavation support systems to withstand an additional 2 feet of excavation below proposed bottom of excavation without redesign except for the addition of lagging and/or bracing.

6. Maximum width of pipe trench excavation shall be as indicated on the drawings.
7. Do not cast permanent structure walls directly against excavation support walls.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Store sheeting and bracing materials to prevent sagging which would produce permanent deformation. Keep concentrated loads which occur during stacking or lifting below the level which would produce permanent deformation of the material.

1.7 PROJECT/SITE CONDITIONS

- A. Subsurface Conditions: Refer to Appendix A of the Specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Steel: All soldier piles, wales, rakers, struts, wedges, plates, waterstop and accessory steel shapes shall conform to ASTM A36.
- B. Steel Sheet Piling: ASTM A328, continuous interlocking type.
- C. Timber Lagging Left in Place: Pressured treated per appropriate AWWA standards.
- D. Tieback Tendons: Tieback tendons shall be high strength steel wire strand cables conforming to ASTM A416, or bars conforming to ASTM A722. Splicing of individual cables shall not be permitted.
- E. Raker Ties: ASTM A615 Grade 60.
- F. Cement Grout Materials and Admixtures for Tieback Anchorages: Grout cube strength shall be a minimum 3500 psi at 7 days and 5000 psi at 28 days.
- G. Concrete: Refer to Section 03300.
- H. Tamping tools adapted for backfilling voids after removal of the excavation support system.
- I. Provide specific trench box sizes for each pipe and utility excavation with structural capacity of retaining soil types as described in OSHA's 29 CFR Part 1926 Subpart P.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation of the temporary excavation support systems shall not commence until the related earth excavation and dewatering submittals have been reviewed by the Engineer with all Engineer's comments satisfactorily addressed.
- B. Install excavation support systems in accordance with the temporary excavation support plan.
- C. If utilizing a tieback system, all performance and proof tests shall be conducted in the presence of the Engineer. Testing performed without the Engineer present will not be accepted. Repeat testing in the Engineer's presence at no additional cost to the Owner.
- D. Do not drive sheeting within 100 feet of concrete less than seven (7) days old.
- E. Carry out program of temporary excavation support in such a manner as to prevent undermining or disturbing foundations of existing structures of work ongoing or previously completed.
- F. Bottom of the trench box excavation support system shall be above the pipe invert prior to installing the pipe.
- G. Install and survey geotechnical instrumentation in accordance with the temporary excavation support plan. Notify the Engineer immediately if any geotechnical instrumentation is damaged. Repair or replace damaged geotechnical instrumentation at the sole option of the Engineer and at no additional cost to the Owner.
- H. Continuously monitor movements of the ground adjacent to excavation support systems and adjacent structures. In event of the measured movements approaching or exceeding the allowable movements, take immediate steps to arrest further movement by revising procedures such as providing supplementary bracing, filling voids behind the trench box, supporting utilities or other measures (Construction Contingency Plan) as required.
- I. Notify utility owners if existing utilities interfere with the temporary excavation support system. Modify the existing utility with the utility owners' permission or have the utility owner make the modifications at no additional cost to Owner.

3.2 GROUND DEFORMATION ADJACENT TO EXCAVATION SUPPORT SYSTEMS

- A. See Specification Section 02017 – Geotechnical Instrumentation.

3.3 REMOVAL OF EARTH RETENTION SYSTEM

- A. Sheet piling shall not be left in place unless otherwise indicated or approved in writing by the Engineer.
- B. When indicated or approved by the Engineer, remove the temporary excavation support system without endangering the constructed or adjacent structures, utilities, or property. Immediately backfill all voids left or caused by withdrawal of temporary

excavation support systems with bank-run gravel, screened gravel or select borrow by tamping with tools specifically adapted for that purpose.

- C. When tiebacks are used, release tension in tiebacks as the excavation is backfilled. Do not leave tensioned tieback in place at the completion of the work.
- D. The excavation support system left-in-place shall be cut-off a minimum of 2 feet below the bottom of the next higher foundation level or a minimum of 5 feet below finished grade.
- E. Conduct survey of the locations and final cut-off elevations of the excavation support systems left in place.
- F. Submit as-built information, prior to backfilling.

3.4 CONTRACT CLOSEOUT

- A. Provide in accordance with Section 01700.

END OF SECTION 02160

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SECTION 02200

EARTHWORK

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes excavations of normal depth in earth for trenches and structures; backfilling such excavations to the extent required; filling; rough grading; cofferdamming; constructing embankments; miscellaneous earth excavation; temporary excavation support; the removal, hauling and stockpiling of suitable excavated material for subsequent use in the work; all rehandling, hauling and placing of stockpiled materials for use in refilling, filling, backfilling, grading and such other operations; the removal and satisfactory disposal off the site of unsuitable material; compaction; and appurtenant work, complete, in accordance with the Drawings and Specifications, and as directed.
- B. Drawings and general provisions of DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS and other DIVISION 1 Specification Sections, apply to this section. Related Sections include the following:
 - 1. Section 02140 – Dewatering and Discharge.
 - 2. Section 02160 – Temporary Excavation Support
 - 3. Section 02570 – Site Sewer
 - 4. Section 02615 – DI Pipe and Fittings
 - 5. Section 02640 – Hydrants, Valves and Appurtenances

1.2 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Backfill Materials: If requested by the Engineer, submit a grain size analysis and curve performed in accordance with ASTM D422 for each proposed source of backfill for review by the Engineer. The grain size analysis shall indicate that the backfill material conforms to the gradation requirements specified.
- C. If requested by the Engineer, submit a grain size analysis and a constant head permeability result in accordance with ASTM D422 and ASTM D2434 respectively for each proposed source of the drainage sand for review by the Engineer.
- D. If requested by the Engineer, submit a controlled density fill (CDF) mix design

showing the proportions and gradations of all materials.

- E. If requested by the Engineer, submit a moisture-density curve indicating the maximum dry-density and optimum moisture content as determined by ASTM D1557 for each proposed source of backfill for review by the Engineer.
- F. Submit the qualifications of the independent geotechnical testing laboratory performing soil testing and inspection services during earthwork operations. The geotechnical testing laboratory must demonstrate to the Engineer's satisfaction, based on evaluation of laboratory submitted criteria conforming to ASTM D3740, that it has the experience and capability to conduct required field and laboratory geotechnical testing. In addition, the laboratory shall be supervised by a Registered Professional Engineer in the State of Massachusetts.
- G. Submit an excavation, backfilling, and filling plan at least one week prior to start of any earth moving activities. The review will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy and safety of the means, methods and sequencing of construction. The plan shall include, but not be limited to the following items:
 - 1. Detailed sequence of work.
 - 2. General description of construction methods.
 - 3. Numbers, types, and sizes of equipment proposed to perform excavation and compaction.
 - 4. Details of dust control measures.
 - 5. Proposed locations of stockpiled excavation and/or backfill materials.
 - 6. Proposed surplus excavated material off-site disposal areas and required permits.

1.3 EXCAVATION CLASSIFICATIONS

- A. Earth Excavation or "Excavation" consists of removal of materials encountered to the subgrade elevations indicated and subsequent reuse or disposal of the materials removed. All excavation is classified as earth excavation unless it otherwise meets the classifications provided below for exploratory excavation, unauthorized excavation, additional excavation, or rock excavation.
- B. Exploratory Excavation, also referred to as test pits, shall consist of the removal of materials for the purpose of locating underground utilities or structures as an aid in establishing the precise location of new work. Exploratory excavation shall be performed as shown on the plans and as directed by the Engineer. Exploratory

excavation not directed or approved by the Engineer shall be at the Contractor's expense.

C. Unauthorized Excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at Contractor's expense.

D. Additional Excavation:

1. When excavation has reached required subgrade elevations, notify the Engineer who will review subgrade conditions.
2. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by the Engineer.
3. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work or as provided for under the unit rates for this classification.

E. Rock Excavation:

1. Rock excavation in trenches and pits includes removal and disposal of materials and obstructions encountered which cannot be excavated with a 1.0 cubic yard (heaped) capacity, 42-inch wide bucket on track-mounted power excavator equivalent to Caterpillar Model 215, rated at not less than 90HP flywheel power and 30,000 lb. drawbar pull. Trenches in excess of 10 foot 0-inches in width and pits in excess of 30 feet 0-inches in either length or width are classified as open excavation.
2. Rock excavation in open excavations includes removal and disposal of materials and obstructions encountered which cannot be dislodged and excavated with modern track-mounted heavy-duty excavating equipment without drilling, blasting or ripping. Rock excavation equipment is defined as Caterpillar Model No. 973 or No. 977K, or equivalent track-mounted loader, rated at not less than 170HP flywheel power and developing 40,000 lb. break-out force (measured in accordance with SAE J732C).
3. Determination of rock excavation classification will be made by the Engineer. Typical of materials classified as rock are boulders 2.0 cu. yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits. Intermittent drilling, blasting or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by Engineer. If the area to be excavated is preblasted prior to the excavation of overburden soils, the Engineer shall be notified at least two days in advance

to allow observation of the preblast drilling by the Engineer in order to classify the excavation. Visual observation of the completed excavation may be made by the Engineer to modify the excavation classifications. Removal of rock excavation prior to classification by the Engineer shall be considered as earth excavation unless accepted by the Engineer in writing. Such excavation will be paid on the basis of contract unit rates for this classification.

4. Rock payment lines are limited to the following:
 - a. Two feet outside of concrete work for which forms are required, except footings.
 - b. One foot outside perimeter of footings.
 - c. In pipe trenches, depth limits shall be 6-inches below bottom of pipe.
 - d. Width payment is limited to a maximum of two (2) feet greater than the inside diameter of the pipe. Any rock excavated to a depth or width greater than the above shall be removed and backfilled with common fill at the Contractor's expense.
 - e. Rock sloping across the width of trench shall have the top of rock established at the rock elevation over the centerline of the pipe.
 - e. Rock excavation within the limits of pipe jacking / tunneling or which are included under other items of work will not be considered as rock excavation.

1.4 EXCAVATION

- A. The Contractor shall perform all excavations of every description and of whatever substances encountered, in a manner as required to allow for placing of temporary earth support, forms, installation of pipe and other work, and to permit access to the Engineer for the purpose of observing the work. Excavations shall be to such widths as will give suitable space for the required work. Bottoms of trenches and excavations shall be protected from frost and shall be firm, dry and in an acceptable condition to receive the work; work shall not be placed on frozen surfaces nor shall work be placed on wet or unstable surfaces.
- B. All excavations made in open cut will be controlled by the conditions existing at the various locations and shall always be confined to the limits as designated by the Engineer. In no case shall earth be excavated or disturbed by machinery so near to the finished subgrade for structures and pipelines as to result in the disturbance of the earth below the subgrade. The final excavation to subgrade should be accomplished with a smooth faced bucket or by hand if directed by the Engineer.
- C. The Contractor shall satisfy all dewatering requirements specified in Section 02140 – Dewatering before performing trench excavations.

1.5 TEMPORARY EARTH SUPPORT

- A. The Contractor shall furnish, place and maintain such sheeting, shoring, and bracing at locations necessary to support the sides of excavations and to prevent danger to persons or damage to pavements, facilities, utilities, or structures, and to prevent injurious caving or erosion or the loss of ground, and to maintain pedestrian and vehicular traffic as directed and required.
- B. In all sheeting, shoring and bracing operations, care shall be taken to prevent injury to persons or damage to structures, facilities, utilities and services. Any injuries to persons shall be the responsibility of the Contractor; and any damage to the work occurring as a result of settlement, water or earth pressure, or other causes due to inadequate bracing or other construction operations of the Contractor shall be satisfactorily repaired or made good by the Contractor, at no additional expense to the Owner.
- C. Where sheeting is to be used, it shall be driven ahead of excavation operations to the extent practicable so as to avoid the loss of material from behind the sheeting; where voids occur outside of the sheeting, they shall be filled immediately with selected fill, thoroughly compacted.
- D. The Contractor shall leave in place all sheeting and bracing at the locations and within the limits ordered by the Engineer in writing. The Contractor shall cut off the sheeting at elevations to be determined by the Engineer.
- E. Conform to the requirements of the OSHA Standards and Interpretations: "Part 1926 Subpart P-Excavation, Trenching, and Shoring".
- F. The Contractor shall comply with all federal, state, and local safety regulations, and requirements.

PART 2 – PRODUCTS

2.1 BACKFILL MATERIALS

- A. Common Fill: Common fill shall be soil containing no stone greater than 2/3 loose lift thickness. The materials shall be free of trash, ice, snow, tree stumps, roots and other organic and deleterious materials. Common fill shall not contain more than 35 percent by weight of silt and clay. It shall be of such a nature and character that it can be compacted to the specified densities in a reasonable length of time. Topsoil and subsoil shall not be considered common fill.
- B. Structural Fill: Structural fill shall consist of gravel and sand consisting of hard durable particles, and free from trash, ice and snow, tree stumps, roots and other organic and deleterious or organic matter. Structural fill shall conform to the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
8-inch	100 ⁽¹⁾
3-inch	70-100
1-inch	45-90
No. 4	20-70
No. 10	15-60
No. 40	10-40
No. 200	0-10

(1) 4-inch maximum particle size within 12 inches of slab, footing or pavement grade.

- C. Sand and Gravel: Sand and gravel fill shall consist of hard, durable sand and gravel, and shall be free from ice and snow, roots, sod, rubbish, and other deleterious or organic matter. It shall conform to the following gradation requirements.

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
(a)	100
1/2-inch	50-85
No. 4	40-75
No. 10	---
No. 40	10-35
No. 100	(b)
No. 200	0-8
Notes:	
(a)Maximum grain size shall be 4-inches where placed as base below slab and pavement; elsewhere 2/3 of the loose lift thickness.	
(b)The amount passing the No. 100 sieve should be between 40 percent and 70 percent of the amount passing the No. 40 sieve.	

- D. Crushed Stone: Crushed stone shall consist of durable crushed rock or durable crushed gravel stone, free from ice and snow, sand, clay, loam, or other deleterious or organic material. The crushed stone shall be uniformly blended and shall conform to the following requirements:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>	
	<u>3/4-inch Stone¹</u>	<u>1/2-inch Stone</u>
1-inch	75-100	---
3/4-inch	0-5	---
5/8-inch	---	100
1/2-inch	---	85-100
3/8-inch	---	15-45
No. 4	---	0-15
No. 8	---	0-5

1. Stone shall be washed

- E. Processed Gravel for Subbase: Processed gravel for subbase shall be used where

specified and shall consist of inert material that is hard, durable stone and coarse sand free from frost, frozen lumps, loam and clay, surface coatings, and deleterious materials.

Gradation requirements for processed gravel for subbase shall be as designated by MHD M1.03.1 and shall conform to the following:

<u>Sieve Size</u>	<u>Nominal</u> <u>Percent</u> <u>Passing</u> <u>by</u> <u>Weight</u>
3 inch	100
1 ½"	70-100
¾"	50-85
No. 4	30-60
No. 200	0-10

- F. Controlled Density Fill (CDF) material is flowable, self-consolidating, rigid setting, low density material that substitute for compacted gravel for backfills, fills and structural fills. There are two main categories for CDF's, excavatable and non-excavatable with a subcategory of flowable and very flowable. It shall be a mixture of Portland cement, flyash, sand and water designed to provide strengths within the range specified.

The categories of CDF's are:

Type 1	Very Flowable (Non-Excavatable)
Type 1E	Very Flowable (Excavatable)
Type 2	Flowable (Non Excavatable)
Type 2E	Flowable (Excavatable)

- G. Pea Gravel: Durable particles composed of small, smooth, rounded stones or pebbles and graded within the following limits when tested in accordance with ASTM C 136:

<u>Sieve Size</u>	<u>Nominal</u> <u>Percent</u> <u>Passing</u> <u>by</u> <u>Weight</u>
1 inch	100
No. 4	10-30
No. 8	0-10
No. 16	0-5

- H. Gravel borrow. Gravel borrow shall consist of inert material that is hard, durable stone and coarse sand free from frost, frozen lumps, loam and clay, surface coatings, and deleterious materials.

Graduation requirements for gravel shall be determined by AASHTO-T11 and T27 and shall conform to the following:

<u>Sieve Size</u>	<u>Percent Passing</u>
1/2-inch	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-10
Maximum size of stone in gravel shall be 2 inches	

- I. Temporary fill for construction mat stabilization. Temporary fill for leveling of construction mats within the sewer easement shall be washed cobbles or washed rip rap between 3” and 6” in size. Temporary fill shall be hard, durable stone free from materials smaller than 2”. Placement of temporary fill shall be coordinated with the Engineer. Temporary fill shall be placed on top of a layer of straw or hay that shall serve as a marker barrier between existing materials and temporary fill materials. All temporary fill shall be removed along with removal of construction mats after completion of utility construction activities.
- J. Sand: The sand material shall consist of uniformly graded coarse gravel with a minimum particle size of 2mm and a maximum particle size of 8mm. The sand shall contain less than 2% fines.
- K. Rip Rap Stone: The rip rap stone material shall conform to the MHD requirements specified in Section M2.02.4.

2.2 DUST CONTROL

- A. Water application shall be the only mean for dust control.

PART 3 – EXECUTION

3.1 FILLING AND BACKFILLING

- A. Subgrade Preparation: After the subgrade has been shaped to line, grade, and cross-section, it shall be thoroughly compacted. This operation shall include any required reshaping and wetting to obtain proper compaction. All soft or otherwise unsuitable material shall be removed and replaced with suitable material from excavation or borrow. The resulting area, and all other low sections, holes, or depressions shall be brought to the required grade with accepted material and the entire subgrade shaped to line, grade and cross-section and thoroughly compacted.
- B. Backfill Material Selection: Unless otherwise specified or directed, material used for filling and backfilling shall meet the requirements specified under Materials (Part 2). In general, the material used for backfilling utility trench excavations shall be material removed from the excavations provided that the reuse of these materials result in the required trench compaction and meets the requirements specified for common fill. All backfill placed within the building limits shall be structural fill

unless otherwise specified. In areas where the bottom of the excavation is in fine sand and silt, and is below the groundwater table, the first lift of backfill shall be 12-inches of compacted sand and gravel to provide a working mat and drainage layer.

Place backfill to a maximum loose lift thickness of 12 inches. Maintain backfill material with uniform moisture content, with no visible wet or dry streaking, between plus 2 percent and minus 3 percent of optimum moisture content. The final filled soil mass shall be as uniform as possible in lift thickness, moisture content, and effort required to compact soil mass.

C. Trench Backfill:

1. The trenches shall be backfilled as soon as practicable with suitable material. All trench backfilling shall be done with special care, in the following manner and as directed by the Engineer.
2. Backfill material for pipe bedding shall be deposited in the trench, uniformly on both sides of the pipe or conduit, for the entire width of the trench to the springline of the pipe. The selected backfill material shall be placed by hand shovels, in layers not more than 4-inches thick in loose depth, and each layer shall be thoroughly and evenly compacted by tamping on each side of the pipe to provide uniform support around the pipe, free from voids.
3. The balance of backfill shall be spread in layers not exceeding 12-inches in loose depth. Each layer shall be thoroughly compacted by mechanical methods and shall contain no rock, stones or boulders larger than 4-inches in their greatest dimension.
4. All trench backfilling shall be done with special care and must be carefully placed so as not to disturb the work at any time; if necessary, a timber grillage or other suitable method shall be used to break the fall of material. The moisture content of the backfill material shall be such that proper compaction will be obtained. Puddling of backfill with water will not be permitted. Backfill within areas to receive topsoil or pavement construction shall be made to grades required to establish the proper subgrade for the placement of topsoil or pavement base courses.
5. In backfilling trenches, each layer of backfill material shall be moistened and compacted to a density at least equal to that of the surrounding undisturbed earth, and in such a manner as to permit the rolling and compaction of the filled trench or excavation with the adjoining earth to provide the required bearing value, so that paving of the excavated and disturbed areas, where required, can proceed immediately after backfilling is completed.
6. Any trenches or excavations improperly backfilled or where settlement occurs shall be reopened, to the depth required for proper compaction, then refilled and compacted with the surface restored to the required grade and condition, at no additional expense to the Owner.

7. During filling and backfilling operations, pipelines and electrical trenches will be checked by the Engineer to determine whether any displacement of the pipe has occurred. If the observation of the pipelines shows poor alignment, displaced pipe or any other defects they shall be remedied in a manner satisfactory to the Engineer at no additional cost to the Owner.

D. Backfilling Against Structures:

1. Backfilling against masonry or concrete shall not be done until permitted by the Engineer. The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking or other damage. As soon as practicable after the structures are structurally adequate and other necessary work has been satisfactorily completed, special leakage tests of the structures shall be made by the Contractor, as required by the Engineer. After the satisfactory completion of leakage tests and the satisfactory completion of any other required work in connection with the structures, the backfilling around the structures shall proceed using suitable and approved excavation material. The best of the backfill material shall be used for backfilling within 2 feet of the structure. Just prior to placing backfill, the areas shall be cleaned of all excess construction material and debris and the bottom of excavations shall be in a thoroughly compacted condition.
2. Symmetrical backfill loading shall be maintained. Special care shall be taken to prevent any wedging action or eccentric loading upon or against the structures. During backfilling operations, care shall be exercised that the equipment used will not overload the structures in passing over and compacting these fills. Except as otherwise specified or directed, backfill shall be placed in layers not more than 12-inches in loose depth and each layer of backfill shall be compacted thoroughly and evenly using approved types of mechanical equipment. Each pass of the equipment shall cover the entire area of each layer of backfill.
3. In compacting and other operations, the Contractor shall conduct his operations in a manner to prevent damage to structures due to passage of heavy equipment over, or adjacent to, structures, and any damage thereto shall be made good by the Contractor at no additional expense to the Owner.

- E. After backfilling trenches and excavations, the Contractor shall maintain the surfaces of backfill areas in good condition so as to present a smooth surface at all times level with adjacent surfaces. Any subsequent settling over backfilled areas shall be repaired by the Contractor immediately, in a manner satisfactory to the Engineer, and such maintenance shall be provided by the Contractor for the life of this Contract, at no additional expense to the Owner.

- F. The finished subgrade of the fills and filled excavations upon which topsoil is to be

placed, or pavements are to be constructed, shall not be disturbed by traffic of other operations and shall be maintained in a satisfactory condition until the finished courses are placed. The storage or stockpiling of materials on finished subgrade will not be permitted.

- G. Uniformly smooth grading of all areas to be graded, as indicated and as directed, including excavated and filled sections, embankments and adjacent transition areas, and all areas disturbed as a result of the Contractor's operations, shall be accomplished. The finished surfaces shall be reasonably smooth, compacted and free from surface irregularities.

3.2 COMPACTION

- A. Compaction Requirements: The degree of compaction is expressed as a percentage of the maximum dry density at optimum moisture content as determined by ASTM Test D1557, Method C. The compaction requirements are as follows:

Area	ASTM Density Degree of Compaction
Below footings	95%
Below slabs	95%
Against concrete structures	95%
Pavement base course	95%
Pavement subbase	95%
General fill below pavement subbase	95%
Trench backfill - below pavements	95%
- below landscaped areas	90%
- below structures	95%
Other areas	90%

- B. Moisture Control:

1. Fill that is too wet for proper compaction shall be disced, harrowed, or otherwise dried to a proper moisture content to allow compaction to the required density. If fill cannot be dried within 24 hours of placement, it shall be removed and replaced with drier fill.
2. Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.

- C. Unfavorable Conditions:

1. In no case shall fill be placed over material that is frozen. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed

until the moisture content and the density of the previously placed fill are as specified.

2. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of the day's operations. Prior to terminating work for the day, the final layer of compacted fill shall be rolled with a smooth wheeled roller to eliminate ridges of soil left by compaction equipment.

D. Compaction Control:

1. In-place density tests shall be made in accordance with ASTM D1556, D2922 or D2167 as the work progresses, to determine the degree of compaction being attained by the Contractor. Any corrective work required as a result of such tests, such as additional compaction, or a decrease in the thickness of layers, shall be performed by the Contractor at no additional expense to the Owner. In-place density tests will be made at the Contractor's expense by the geotechnical testing laboratory.
2. The Engineer's duties do not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Engineer nor any observation and testing performed by him shall excuse the Contractor from defects discovered in his work at that time or subsequent to the testing.
3. In-place density tests shall be performed as a minimum according to the following:
 - a. One test per lift under spread footings.
 - b. One test per lift for every 100' length of strip footings.
 - c. A minimum of every 50 cubic yards of backfill in trenches or around structures.
 - d. One test every 500 cubic yards of material placed for embankment construction.
4. Minimum testing requirements for granular drainage and cover material placed over the impervious cover material or liner are as follows:

Type of Test	Frequency	Testing Method(s)
Grain Size Analysis (to the No. 200 Sieve)	1 test/1500 cy	ASTM D-422
Permeability	One test/3000 cy	ASTM D-2434
Proctor Compaction Test	One test/source	ASTM D-1557

E. Placement:

1. All fill shall be placed in horizontal layers. Fill shall not be placed following the natural contours of the ground. Fill shall be placed starting in the lowest areas working up to finish grades in horizontal layers in the manner specified herein. Each layer of fill should be benched into the existing slope in order to avoid the formation of a shear plane.

3.3 FINE GRADING

- A. Before surface or subbase is spread, the subgrade shall be shaped to a true surface conforming to the Drawings. All depressions and high spots shall be filled with suitable material or removed and such areas again compacted until the surface is smooth and properly compacted. A tolerance of 1/2-inch above or below the finished subgrade will be allowed provided that this 1/2-inch above or below grade is not maintained for a distance longer than 50 feet and that the required crown is maintained in the subgrade. Any portion which is not accessible to a roller shall be thoroughly compacted by other mechanical methods.

3.4 STOCKPILING AND USE OF SURPLUS EXCAVATED MATERIALS

- A. The Contractor shall strip and stockpile excavated materials. Any bushes that are removed shall be protected and replanted in the same location. Removed curbing shall be stockpiled in a safe manner. Where grassed areas are disturbed by stockpiled materials, the Contractor shall rake out the area and loam and re-seed at his expense.
- B. Stockpiling of materials shall be included in the pay items for excavating and no allowances shall be made for any stripping and stockpiling requirements.
- C. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided by the Contractor. When required, it shall be re-handled and used in backfilling the trench.
- D. Use of surplus excavated materials (not including pavement or asphaltic concrete) as backfill material is permitted if surplus material meets requirements of backfill materials as specified above. All other surplus material shall be taken off-site and disposed of legally at the Contractor's expense.
- E. Testing of surplus excavated materials shall be provided as described in 1.2B to confirm compliance with specifications. Submit test results to Engineer one week prior to backfill operations.

3.5 EXCAVATION SUPPORT SYSTEM

- A. Furnish, put in place and maintain sheeting and bracing required by Federal, State or local safety requirements to support the sides of the excavation and prevent loss of ground which could endanger personnel, damage or delay the work or endanger adjacent structures. If the Engineer is of the opinion that at any point sufficient or

proper supports have not been provided, he/she may order additional supports placed at the expense of the Contractor. Compliance with such order shall not relieve the Contractor from his/her responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

- B. When moveable trench bracing such as trench boxes, manhole boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the screened gravel backfill.
- C. When installing pipe; trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, screened gravel shall be placed to fill any voids created and the screened gravel and backfill shall be recompacted to provide uniform side support for the pipe.
- D. The Contractor will be permitted to use steel sheeting in lieu of wood sheeting for the entire job wherever the use of sheeting is necessary. The cost for use of sheeting will be included in the bid items for pipe and shall include full compensation for driving, bracing and later removal of sheeting.
- E. All sheeting and bracing shall be carefully removed in such manner as not to endanger the construction of other structures, utilities, or property, whether public or private. All voids left after withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as directed.
- F. The Contractor shall receive no payment, for sheeting, bracing, etc., during the progress of the work. The Contractor shall receive no payment for sheeting which has actually been left in the trench for the convenience of the Contractor.
- G. Sheeting driven below mid-diameter of any pipe shall remain in place from the driven elevation to at least 1-ft above the top of the pipe.

3.6 DUST CONTROL

- A. Calcium chloride application will not be permitted unless it is approved by the Engineer
- B. Water application shall be the only method used for dust control. Application shall be by means of a water truck or other approved method. The number and frequency of applications shall be determined by the Engineer.

END OF SECTION 02200

SECTION 02212
ROCK EXCAVATION

PART 1 – GENERAL

1.1 SUMMARY

1.2 SUMMARY

- A. Rock excavation may be required where boulders, monolithic concrete, reinforced concrete or stone structures measuring in excess of two cubic yards solid in volume or larger are encountered or solid ledge which, in the opinion of the Engineer, requires wedging, sledging, barring, or hydraulically fracturing for removal, is encountered.
- B. The following do not constitute rock excavation: hardpan; soft or disintegrated rock; concrete which can be removed with a pick; previously blasted rock or broken stone less than the above mentioned two cubic yards; stone walls; rocks or sections of blasted ledge that may fall into or be jarred loose from the sides of the trench beyond the maximum limits of excavation approved by the Engineer.

1.3 SCOPE OF WORK

- A. **Due to the proximity of residential dwellings and the MBTA railroad, blasting is not permitted.**

1.4 RELATED WORK

- A. Earth excavation and backfilling are included in Section 02200.
- B. Environmental Protection is included in Section 01110.

1.5 DEFINITIONS

- A. Typical of materials classified as rock are boulders 2.0 cu. yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by Engineer. Visual observation of the completed excavation may be made by the Engineer to modify the excavation classifications. Removal of rock excavation prior to classification by the Engineer shall be considered as earth excavation unless accepted by the Engineer in writing. Such excavation will be paid on the basis of contract unit rates for this classification.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Gravel borrow shall be as specified in Section 02200.

PART 3 – EXECUTION

A. DISPOSAL OF ROCK AND BOULDERS

- A. Fragmented rock with dimensions not exceeding 6-in in any direction may be mixed with common fill, providing compaction requirements will not be compromised.
- B. Rock and boulders may be crushed and screened for reuse in the Work, provided that the resultant materials meet the requirements for gravel borrow, processed gravel, or crushed stone as specified in Section 02200.
- C. Unused rock and boulders shall be removed and disposed of off-site.

END OF SECTION 02212

SECTION 02222

CLEARING AND GRUBBING

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. This work shall consist of clearing, grubbing, cutting, removal, and disposal of all vegetation and debris from areas either within or outside of the right-of-way or limit of work as shown on the drawings or as designated by the Engineer. The work shall also include the preservation from injury or defacement of all vegetation and objects designated by the Engineer to remain.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 GENERAL

- A. The burning of trees, brush, stumps, etc., will not be permitted. The Contractor shall provide other satisfactory methods of disposal without additional compensation.
- B. The Contractor shall obtain written permission of the Engineer for use of storage areas within the right-of-way requiring clearing and grubbing or selective clearing and thinning. Any clearing for the Contractor's convenience shall be done at his own expense. All such areas shall be restored to a condition acceptable to the Engineer including necessary mulching, seeding, and planting without additional compensation.
- C. The Engineer shall be provided with notarized copies of agreements between the Contractor and owners used as disposal or storage areas.
- D. When fencing is installed outside normal clearing areas, every reasonable effort shall be made to preserve trees or shrubs whose removal is not essential to the installation of the fencing.
- E. Acceptable material obtained on the project may be used to produce wood chip mulch. Material obtained from Elm trees shall not be accepted for use.
- F. Wood chips produced on the project from clearing and grubbing shall be stockpiled within the location and used where and as directed.
- G. Except for materials used for making wood chip mulch, the Contractor shall make all arrangements and negotiations necessary for the satisfactory disposal of trees, shrubs, stumps, roots, dead wood and other litter, in areas outside the Right-of-Way and in such manner that no condition or accumulation of material shall be permitted to disfigure or mar the finished landscape.

3.2 CLEARING AND GRUBBING

- A. The stumps of all trees, brush and major roots shall be grubbed and removed in all excavation areas and under all embankments where the original ground level is within 3-1/2 feet of the subgrade or slope of embankments.
- B. All trees, stumps, and brush shall be cut off within 6 inches of the ground in embankment areas where the original ground level is more than 3-1/2 feet below the subgrade or slope of embankments.
- C. Trees and shrubs that are specifically designated by the Engineer not to be cut, removed, destroyed or trimmed shall be saved from harm and injury.
- D. All damage done to trees by the Contractor's operation and all branches of trees extending within the roadway shall be trimmed and painted where cut as directed to provide a 20-foot minimum vertical clearance including selective trimming of such trees as directed.

3.3 SELECTIVE CLEARING AND THINNING

- A. The work under this item shall consist of the removal of hazardous growth and dead, dying or diseased plant material; the removal of groups and individual plants which interfere with the growth of more desirable types of trees and the clearing away of lesser growth that may obscure outstanding trees, tree groups, or scenic views. Any part of tree trunks or base of plant material located on the Location Lines shall be considered within the limit of work.
- B. Densely wooded areas shall be trimmed to provide space for healthy growth by eliminating thinner, weaker trees and the reduction of number of varieties.
- C. The Contractor's attention is called to the requirements for work under this item. The desired appearance to be attained in certain areas of heavy growth may require three or more operations. First, the obvious dead, dying and diseased trees and undergrowth shall be cut and cleared out of the area. This work includes the removal of any previously fallen trees, branches, uprooted stumps and other debris as directed. Next, the area is to be thinned out, as directed, by removing the less desirable trees and brush which interfere with the growth of better plant material. Finally, clear out lesser growth which may obscure outstanding trees, tree groups or scenic views.
- D. Tree up-branching and shaping under this item will be restricted to trees which have limbs and branches restricting sight distance, extending over roadways, shoulders, turn outs, etc. Up-branching or trimming will be required to produce an 20-foot minimum vertical clearance over locations described hereinbefore, and the removal of limbs and branches involved in this operation shall be accomplished as outlined hereafter.
- E. Quality of work must conform with accepted tree trimming practices.
- F. All trimming and pruning shall conform to recognized tree surgery practices, and particular note should be made that painting with an approved tree dressing or paint will be required on all cuts 2-inches or over in diameter.

- G. The dressing or paint shall be applied no later than two days after the cuts are made.
- H. Recognized tree surgery practices include among many others, the fact that all limbs and branches which require removal and all shrubs regardless of age must be cut flush either to a union with the next larger sound limb or branch or flush to the trunk of the tree.
- I. The cutting shall be performed by experienced woodsmen. Trained tree climbers are required for pruning of tall growth. Care shall be exercised by the Contractor to prevent injury to trees and shrubs designed to be preserved. Any injury to limbs, bark or roots of such plants shall be repaired by the Contractor, as directed, or the plants replaced without additional compensation for such repair or replacement.
- J. Standing trees, undesirable brush and existing stumps to be removed shall be cut flush with the ground and a 2 inch tolerance permitted and the resulting stumps or stubble then brushed or sprayed with a chemical spray material.
- K. Applications shall be by brush or spray so as to give complete coverage and wetting to the point of runoff.
- L. This application shall be completed within two days after the cutting.
- M. As the specified chemical herbicide is harmful to desirable roadside growth, the Contractor shall apply the chemical in such a manner that damage will not occur either from direct spray or from drift of the chemical on any desirable growth.
- N. The Contractor shall use all necessary precautions to prevent injury to crops or damage to other desirable growth on private abutting property, as well as those within the Right-of-Way, and shall assume full responsibility for any damage.
- O. The Contractor may dispose of cut material by processing into a wood chip mulch and spreading uniformly throughout the cleared and thinned areas as directed by the Engineer.

3.4 DISPOSAL OF TREES

- A. All trees to be cleared shall become the property of the Contractor, and the satisfactory disposal of the wood in such trees outside the right-of-way shall become his/her responsibility.
- B. The trees, including cuttings and slash, shall be disposed of after cutting as soon as practicable and in a manner as not to detract from the appearance of the roadside.
- C. If the existing ground in the area is disturbed by any of the work or equipment, the Contractor shall rough-grade and loam and seed if necessary the disturbed areas, if so directed, without additional compensation.

3.5 DISPOSAL OF STUMPS AND BRUSH

- A. After removal, all stumps including the major root system shall be disposed by the Contractor at his/her own responsibility outside the layout where the material will not cause obstruction to streams and will not detract from the appearance of the roadside.

END OF SECTION 02222

SECTION 02340

PIPE JACKING

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of this Section shall include the “trenchless” installation of utilities using jacking methods at the locations shown and noted on the Drawings. The Work of this Section includes furnishing of all supervision, material, labor, tools, equipment and incidentals necessary to perform the Work in accordance with these Specifications including but not limited to; the design, installation, excavation, and backfilling of the jacking and receiving pits; furnishing and jacking of steel casing pipe; jacking of casing pipe; removal of penetrating obstructions; installation of carrier pipe within casing pipe including pipe supports; leakage and pressure testing of installed pipe as required; filling or grouting of voids between the natural ground and the casing pipe; filling annular space between casing pipe and carrier pipe; providing end seals between the casing pipe and carrier pipe at both ends of the casing pipe; soil disposal; soil stabilization; dewatering; utility relocation and/or support; backfill, Site restoration; and cleanup.
- B. The Work shall fully conform to the requirements of all state, federal, local statutes, laws, codes and regulations.
- C. Existing structures, roadway surface and utilities adjacent to and above the jacked pipe are sensitive to loss of support. The capability to provide full support of the jacked pipe tunnel face is essential to prevent loss of ground that may result in ground settlement and damage to adjacent structures and utilities.
- D. Potential obstructions to pipe jacking and provisions for their removal are delineated in this Section. The Contractor shall fill voids created by the removal of obstructions with grout before or, if that is not possible, immediately after moving the shield past the area of the void. The Contractor shall be prepared to advance the casing in a controlled manner while maintaining stability at the face and avoiding loss of ground.
- E. Contractor shall stabilize ground from the jacking pit to the receiving pit by lowering the groundwater level to at least 24-inches below the casing invert. If additional ground and face stabilization is necessary, supplemental dewatering, soil stabilization and/or other approved means to maintain face stability and avoid loss or heave of ground prior to mining at the face and along the pipe alignment may be used at no additional cost to the Owner.
- F. The Contractor shall perform additional test borings to determine geotechnical and groundwater conditions, as he considers necessary to complete the pipe jacking at no additional cost to the Owner. Any test borings performed by the Contractor shall be backfilled with cement bentonite grout.

1.2 DESIGN REQUIREMENTS

- A. The Contractor's drawings and calculations indicating the design of the work of this Section shall be prepared, stamped, and signed by a Professional Engineer (civil or structural) registered in Massachusetts with a minimum of 5-years demonstrated experience in the design and installation of jacking sleeves, pits, pipes, and appurtenances. The Drawings and design concept shall include but not be limited to the dewatering, soil stabilization, steel casing, protection of existing structures, and installation schedule. The Contractor's Engineer shall review all of the available information indicated on the Drawings, and provided herein and shall be responsible for making whatever additional investigations of the Site that may be necessary.
- B. Design shall meet the minimum requirements of the MBTA Railroad Operations Directorate, latest edition.

1.3 SUBMITTALS

- A. The Contractor shall submit the following information to the Engineer as one complete Work plan in accordance with Section 01300 – SUBMITTALS:
 - 1. Shop Drawings showing size, location and basis of design for temporary excavation support reaction blocks, jacking pits, and receiving pits. The Drawings and calculations indicating the design of the Work of this Section shall be prepared, stamped, and signed by a Professional Engineer registered in the Commonwealth of Massachusetts with qualifications as specified below in Quality Control. Submit Professional Engineer's qualifications.
 - 2. Number, capacity, and placement of jacks
 - 3. Procedures for monitoring line and grade.
 - 4. Method(s), size, arrangement and installation of dewatering equipment.
 - 5. Detailed description of equipment, materials, sequence and procedures for jacking pipe, including provisions for standby and backup equipment; proposed method of monitoring and maintaining direct jacked pipe alignment; and materials, sequence and procedures for installing, supporting, and testing carrier pipe inside primary casing including provisions for cathodic protection.
 - 6. Revisions to Shop Drawings, as necessary to accommodate field conditions and comply with the Specifications herein.
 - 7. Method and materials of pressure grouting voids outside of the steel casing pipe.
 - 8. Detailed descriptions of materials, sequence and procedures for installing the sewer within the steel sleeves, including cleaning and testing the sewer within

the sleeve.

9. Method of filling the annular space between the installed carrier pipes and the steel jacking sleeve.
10. Casing spacers and bulkhead designs.
11. Certificate of Design stamped by a registered Professional Engineer (civil or structural) stating that the steel jacking sleeve is designed for the anticipated design loads.
12. The following as a complete package related to the cement grout used for filling voids outside of the casing and annular space filling:
 - a. Proposed grout mix design;
 - b. Proposed densities and viscosities;
 - c. Initial set times of the grout;
 - d. Proposed method, plans and criteria of grouting operations;
 - e. Maximum injection pressures;
 - f. The 24-hour and 28-day minimum compressive strength;
 - g. Proposed grout stage volumes;
 - h. The bulkhead designs and proposed positive method(s) of securing carrier pipe to prevent flotation;
 - i. Buoyant force calculations;
 - j. Pressure gauge certification;
 - k. Vent location plans; and
 - l. Qualifications of soil stabilization and grouting subcontractor(s).
13. Hydraulic jack specifications including manufacturer, model number, capacity, and other pertinent information.
14. Details of settlement monitoring program including, but not limited to, types, locations, baseline data, frequency of monitoring, reports, and forms to be used.
15. Certificate of Design stamped by a registered Massachusetts Professional Engineer showing that the jacked pipe used in the Work is designed for the anticipated jacking loads. Submit documentation that demonstrates pipe joints can withstand the jacking forces.
16. Evidence of Contractor's or subcontractor's experience as specified below in Quality Control. Contractor or Subcontractor shall also provide names and telephone numbers of references, and a list of qualified and experienced design and field personnel assigned to the Work.
17. Chemical grout design for soil stabilization, and method and equipment for soil stabilization and void space grouting.

18. Method of penetrating or removing various types of potential obstructions such as rock, boulders, stone blocks, timber, roots, stumps, timber, debris, buried foundations, and other obstructing material.
 19. The Contractor shall submit proposed Work plan for jacking operations complete with schedule.
- B. Upon completion of all jacking operations the Contractor shall submit a complete as-built drawing of all information related to the jacking operation.
 - C. Review of the submitted material by the Engineer shall not indicate acceptance of responsibility of the means and methods of construction but are rather submitted for informational purposes only. The Contractor shall be fully responsible for the entire jacking operation.
 - D. At least 30 days prior to commencing the Work specified in this Section, the Contractor shall submit to the Engineer for review a contingency plan to be implemented if the response values specified in Section 02017 - GEOTECHNICAL INSTRUMENTATION AND MONITORING are reached, or ground movements occur which cause, or threaten to cause, damage of movement of existing structures or utilities.

1.4 QUALITY CONTROL

- A. The Contractor and/or subcontractors for jacking and soil stabilization shall meet the qualifications set forth in the Information for Bidders.
- B. The Professional Engineer responsible for the preparation of the Drawings and basis of design for the jacking shall be a Professional Engineer registered in the Commonwealth of Massachusetts with a minimum of 5-years demonstrated experience in the design and installation of jacking pipes, jacking and receiving pits, and appurtenances.
- C. The Contractor's and Subcontractor's field personnel shall understand all Jacking design documents submitted by the Contractor, and all related Shop Drawing information.

1.5 PROJECT/SITE CONDITIONS

- A. The Contractor shall keep the steel casing subgrade continuously free from ground and surface water during the operation and shall be prepared to implement additional groundwater control on short notice. Observed groundwater levels shall be below the bottom elevation of the trench.
- B. The Contractor shall be fully responsible for inspecting the location where the pipes are to be installed and shall be familiar with the conditions under which the Work will be performed and with all necessary details as to the orderly prosecution of the Work.

- C. The Contractor shall remove obstructions that prevent the pipe from being installed at the proper grade and alignment. Should obstructions associated with concrete and timber pile, foundations, supporting walls, wood, sheeting, boulders, and utilities be encountered, the Contractor shall immediately notify the Engineer. The Contractor shall propose his approach to clear the obstruction so Work can proceed.
- D. The Contractor is prohibited from using any form of blasting at the Site.

PART 2 – MATERIALS

2.1 CEMENT GROUT

- A. The cement grout for annular space filling shall consist of Portland cement. The grout shall not contain products or chemicals corrosive to or deleterious to DI pipe or PVC pipe. The grout shall have a minimum penetration resistance of 100 psi in 24 hours when tested in accordance with ASTM C 403, and a minimum compressive strength of 300 psi in 28 days when tested in accordance with ASTM C 495 or C109. The grout mix shall remain fluid and not thicken for a minimum of two (2) hours or more. The grout mix shall have a density between 40 to 70 pounds per cubic foot to minimize flotation potential of the installed utility.

2.2 STEEL CASING PIPE

- A. Steel casing pipes shall have minimum yield strength of 35,000 psi and conform to ASTM A36 and ASTM A134. The minimum outside diameter of the steel casing pipe shall be 60-inches. Minimum wall thickness shall be 1-inch.
- B. Casing pipe joints shall be fully welded around the circumference of pipe with complete penetration weld at all joints complying with American Welding Society Code or a machined press fit and gasketed installed in accordance with the manufacturer's written recommendations.
- C. Casing pipes shall have grout holes equipped with pipe half-couplings. The 2- inch standard pipe half-couplings welded into the holes in the sleeve, plate or pipe walls shall be provided with threaded cast iron plugs. Four grout ports spaced at 90 degrees on center shall be installed at 4-foot spacing longitudinally along the axis of the pipe.
- D. End caps shall be ¼-inch minimum thickness, two halves welded to the steel casing. Each cap shall have a 1-inch diameter hole at the top and a 1-inch diameter hole at the bottom. End caps shall form a water-tight seal between the end of the steel casing and the carrier pipe for the maximum ground water levels anticipated at this location. Alternative pre-manufactured casing end seals suitable for the casing and carrier pipe sizes shown on the Drawings may be considered, subject to review and approval by the Engineer.

2.3 SPACERS FOR CARRIER PIPE

- A. Spacers shall be custom designed for the carrier pipes. The Contractor shall use casing spacers as manufactured by Advance Products & Systems, Inc. or equal.
 - 1. Factory manufactured fusion-bonded/powder-coated casing spacers shall be constructed of circular carbon steel bands, which bolt together forming a shell around the carrier pipe. The spacers shall be designed with risers and runners to support the carrier within the casing and maintain a minimum clearance of 1.00" between the casing ID and the Spacer OD. Plated steel bolts, nuts, and washers shall be supplied with the casing spacers.
 - 2. The bands shall be manufactured of 8" wide, hot rolled, pickled, and oiled 14-gauge carbon steel. The risers shall be constructed of hot rolled, pickled, and oiled 10-gauge carbon steel having a minimum length of 6" and a height to be determined based on the annular space between the carrier OD and the casing ID.
 - 3. Abrasion resistant runners, having a minimum length of 7" and a minimum width of 2", shall be attached to each band and/or riser to minimize friction between the casing pipe and the carrier pipe as it is installed. Runner material shall be of glass-filled polymer with a compression strength of 33,000 psi, flexural strength of 40,000 psi, and tensile strength of 27,000 psi. The ends of all runners shall be beveled to facilitate installation over rough welds beads or the welded ends of misaligned or deformed casing pipe.
 - 4. Interior surfaces of circular carbon steel band shall be lined with PVC, or EPDM alternate, having a minimum thickness of .090".
- B. Recommended positioning of the spacers is one placed not more than one foot from each end of the casing and pipe joint. Subsequent spacers shall be placed every 6-8 feet apart thereafter.
- C. Spacers shall be secured to the carrier pipe.
- D. Each spacer shall have full length, integrally molded skids extending beyond the bell or mechanical joint of the pipe.
- E. Wood skids or pipe-rail systems are not acceptable.

PART 3 – EXECUTION

3.1 JACKING AND RECEIVING PITS

- A. The Contractor shall provide a seal between the outerface of the casing pipe and the penetration through the jacking and receiving pit walls. The seal shall provide enough resistance to prevent soil fines from washing out from the retained soil. The method of sealing this section of the pit is the responsibility of the Contractor.

- B. Vertical wood sheeting, trench boxes and vertical steel road plates shall not be used for either the jacking or receiving pits temporary excavation supports unless otherwise permitted in writing by the Owner. Refer to Support of Excavation Drawings and Section 02160 for temporary excavation support system requirements.
- C. The Contractor shall design, furnish, install and remove, to the extent required; thrust or reaction block or whatever provisions may be required in driving the casing forward.
- D. The Contractor shall remove, relocate, support in place and/or provide bypass for any utility necessary to install the jacking and/or receiving pits.
- E. Backfill of the jacking and receiving pits shall be in accordance with Section 02200 – EARTHWORK. The jacking and receiving pits shall be backfilled with the same material excavated within the pits or material that meets the Specification requirements for impervious backfill borrow in Section 02200.

3.2 DEWATERING

- A. Dewatering shall be in accordance with Section 02140 – DEWATERING.

3.3 SOIL STABILIZATION

- A. The Contractor shall furnish all labor, materials and equipment to stabilize the soils in the areas of the pipe jacking and at no additional cost to the Owner. Such stabilization shall include, but not be limited to, the use of sodium silicate and bicarbonate of soda solution, cementitious grout or other approved chemical grout materials. The Contractor shall be responsible to determine the grout to be used and the procedure to be followed. A grout injection pattern shall be designed to meet soil and groundwater conditions. The soil stabilization shall extend as far as necessary outside the periphery of the casing pipe and in front of the excavation in order to maintain a stable face at the heading. Rate and injection sequence shall be determined from actual soil, groundwater, and Site conditions.
- B. The design, scheduling, and implementation of all soil stabilization shall be consistent with the traffic management plans and is the responsibility of the Contractor.
- C. The design of the chemical grout mix shall provide the following minimum values when injected into medium dense Ottawa 20-30 sand:
 - 1. Unconfined compressive strength > 100 psi
 - 2. Unconfined initial tangent modulus > 100 psi
 - 3. Permeability $\leq 10^{-6}$ cm/sec
- D. All chemical grouting shall be of a type, capacity and mechanical capability suitable for doing the Work. The equipment shall be maintained in first class operating condition at all times.

- E. The chemical grout pumping unit shall be equipped with piping and/or hoses of adequate capacity to carry the base grout and reactant solutions separately to the point of mixing. The hoses shall come together in a "Y" fitting containing check valves to prevent backflow. The "Y" fitting shall be followed by a suitable baffling chamber, and shall be easily accessible for sampling mixed grout. A water flushing connection or valves shall be placed behind the "Y" to facilitate flushing the grout from the mixing hose and baffle between grouting sessions. Distribution of proportioned grout, under pressure, to the grouting locations, shall be monitored by separate, automatic recording, flow rate indicators and gages.
- F. Chemicals shall be stored in metal tanks, suitably protected from accidental discharge by valves and other necessary means. Tank capacity shall be sufficient to supply at least one day's worth of grouting materials so as not to interrupt the Work in the event of chemical delivery delays.
- G. The Contractor shall provide at the Site all necessary chemical quality control testing apparatus, including but not limited to: hydrometers, balance scales, graduates, viscometer and all other devices that are required to conduct chemical material acceptance tests, chemical proportioning tests, and grout quality tests for proper quality control of the Work. The Grouting subcontractor shall submit certified laboratory testing results documenting the required performance of the proposed chemical grouting at least 30 days prior to the commencement of injection operations.

3.4 JACKING OPERATIONS - GENERAL REQUIREMENTS

- A. Following groundwater control and/or soil stabilization as required, jacking and excavation shall be in accordance with standard practice for the equipment and method selected. The equipment and method of jacking and excavation selected shall minimize settlement of utilities and structures above and adjacent to the jacking alignment, yet be capable of penetrating potential obstructions. The Contractor shall prevent the occurrence of voids outside the jacked pipe that will endanger existing roads or structures. If voids occur, the Contractor shall fill them with cement grout. In order to minimize the voids produced during excavation in the forward end of the jacked pipe, the Contractor shall use a jacking shield.
- B. If voids are detected outside the jacked pipe, the Contractor shall use lowpressure grout to fill all voids. Grouting shall be from the interior of the jacked pipe through grouting ports.
- C. Proper alignment and elevation of the jacked pipe shall be consistently maintained throughout the jacking operation. The steel casing shall be constructed to prevent leakage of any substance except at the ends of the casing.
- D. Once the jacking operation has begun, the Contractor shall work continuously and diligently until the complete length of pipe or casing has been installed. This requirement may be waived if the Contractor demonstrates the ability to bulkhead and stabilize the tunnel face at all times, maintain dewatering, lubricate the sleeve as

needed to prevent “freezing” of the casing, and continue with jacking should it be stopped overnight or for any other reason.

- E. The Contractor shall use a jacking ring to evenly distribute the jacking pressure around the wall of the jacked sleeve and carrier pipe.
- F. The Contractor shall have on Site at all times equipment and materials needed for breasting the full face of the jacking sleeve, dewatering, and jacking operations in accordance with his Work plan.
- G. The Contractor shall use a minimum of two (2) horizontal breastplates on the shield, with breasting boards to maintain face conditions and complete bulk heading when necessary. In addition, the Contractor shall maintain a minimum of two (2) foot plug at the casing face.
- H. As each of the jacked sleeve and carrier pipe are installed and tested, the Contractor shall thoroughly clean the interior of each sleeve/pipe. Casing spacers and/or supports shall be installed to support and align the carrier pipes inside the steel casing. The carrier pipe shall be installed to the line and grade indicated on the Drawings and shall be braced to prevent movement and flotation during the placement of annular space grout. Cathodic protection measurers shall be provided between casing pipe, support structures, and carrier pipe so that adequate separation is provided among each material.
- I. After the pipe is installed and prior to placement of the annular space grout fill, the Contractor shall conduct the specified leakage and pressure tests on the carrier pipes per the specific carrier pipe material specification. Any leaks that are discovered during the testing phase shall be repaired to the satisfaction of the Engineer. No annular space fill shall be placed until the pipe meets with the approval of the Engineer.
- J. The sections of steel sleeve casing shall be field welded in accordance with the applicable portions of AWWA C 206 and AWS D7.0 for field welded water pipe joints.
- K. The Contractor shall be required to have on Site at all times pumps and other associated equipment to dewater the operation.
- L. Vents shall be placed on the upstream and downstream bulkheads, in order to remove air within the annulus and visually demonstrate total annular filling.

3.5 ANNULAR SPACE GROUTING AND FILLING

- A. The annular space between the steel casing pipe(s) and carrier pipe(s) shall be completely filled with grout as specified. After the carrier pipe has been installed and prior to filling the annular space, the ends of the pipe shall be bulk headed and appropriate vents installed. Vents shall be placed in the upstream and downstream

bulkheads in order to remove air in the annular space and to visually demonstrate that the annular space is completely filled.

- B. Systems of standard pipe, fittings, hose and special grouting outlets embedded in the pipe walls shall be provided by the Contractor. Care shall be taken to insure that all parts of the system are maintained free from dirt. Cement grout shall be forced under pressure into the grouting connections of the pipe. Grouting shall be started in the lowest connections and shall proceed until grout begins to flow from upper connections. Connections shall then be made to these holes and the operation continued to completion.
- C. Apparatus for mixing and placing grout shall be capable of mixing effectively and stirring the grout and then forcing it into the grout connections in a continuous uninterrupted flow.
- D. After grouting is completed, pressure shall be maintained by means of stop cocks or other suitable devices until the grout has set sufficiently. After the grout is set, grout holes shall be completely filled with dense concrete and finished neatly without evidence of voids or projections.
- E. The Contractor shall have on-site a grout plant and all facilities and materials required for grouting at all times from the beginning to completion of the jacking operations.

3.6 TOLERANCES

- A. Pipe alignment shall not vary from that shown on the Drawings by more than three-quarters of one inch vertically. Local slope pipe shall not vary more than 0.001 from that specified. Reverse slope of the pipe shall not be permitted.
- B. The outside of the lead casing section or shield shall be not more than 3/4 inch larger in any cross-sectional dimension than the trailing casing sections to minimize ground subsidence.
- C. All additional Work and all redesign necessary due to non-conformance of the Contractor's Work to that specified, shall be performed by the Contractor in a manner acceptable to the Engineer, and at no increase in the Contract Time or Contract Price.

3.7 SAFETY

- A. The air in the pipe shall be monitored in accordance with applicable laws and regulations, for methane or other potentially hazardous gases that may be encountered when jacking through organic soils. If air monitoring indicates that hydrogen sulfide, methane, or other flammable gases exist, the Contractor shall provide additional safety measures, such as additional ventilation, as required by applicable regulations.

3.8 OBSTRUCTIONS DURING JACKING

- A. The Contractor shall remove obstructions that prevent the casing pipe from being installed at the proper grade and alignment. Obstructions may be encountered during the progress of the Work. Obstructions are defined as follows:
 - 1. Obstructions are natural, man-made or man-placed materials, or boulders, occurring at or below ground surface which unavoidably and completely stop the progress of the casing advancement for more than one hour, despite the Contractor's diligent efforts as determined by the Engineer. Naturally occurring cobbles, claystones, sand and gravel layers, glacial till, and other dense well-bonded in-situ soils shall not be considered as obstructions during pipe-jacking excavation. The Work and time required to deal with them is incidental to and included in the pay item for the installation of the pipe by the operations related to this Section. Utilities and utility structures indicated on the Drawings shall not be considered obstructions and shall be removed and relocated as required and approved.
 - 2. Obstructions shall not include any item whose penetration, demolition, removal, or excavation is included clearly and expressly in the Work of any other pay item.
- B. The Contractor shall anticipate encountering obstructions during the pipe-jacking excavation. This Contract establishes a unit pay item for this Work.
 - 1. Time is of the essence in the removal of obstructions. The Contractor's submitted schedule shall identify and provide for all activities and appropriate logic and duration including pre-excavation and obstruction removal.
 - 2. The Contractor shall notify the Engineer, or the Engineer's designated representative, immediately upon encountering any potential obstruction which unavoidably and completely stops the progress of the Work, despite the Contractor's diligent efforts. The notification must be in writing and shall inform the Engineer whether the Contractor considers the potential obstruction as an unknown obstruction or an obstruction covered under another payment item. The notification shall also include all pertinent information relating to the nature, depth, plan location coordinates, expected extent of potential obstruction, and the methods the Contractor intends to use to overcome the potential obstruction. The Contractor shall provide physical evidence, acceptable to the Engineer; of the material comprising the potential obstruction and that the potential obstruction is not bedrock.
 - 3. Upon receiving such notification, the Engineer shall make a determination as to whether the encountered item is an obstruction that has unavoidably and completely stopped the advancement of the jacking. If the Engineer determines that the encountered item is an obstruction that has unavoidably and completely stopped the advancement of the jacking, the Engineer shall so inform the Contractor in writing and the Contractor shall proceed

immediately with diligent efforts to remove the obstruction in accordance with applicable payment items. The Contractor shall also proceed diligently with all aspects of the Work not stopped by obstructions.

4. Remove obstructions by the most diligent means complying with noise and vibration limitations and other specified requirements. Maintain excavation support and protection of nearby utilities at all times.
4. At all times during the removal of obstructions, the Contractor shall diligently pursue the removal of obstructions using all the necessary and appropriate means and methods such as penetrating, cutting, removing, clearing, drilling, splitting, or otherwise making it possible for the casing pipe to advance past any obstruction. This shall include installation of an obstruction removal shaft, if necessary, and if accepted by the Engineer. The Contractor must have on hand at all times readily available equipment, tools, materials, and labor appropriate for the effective removal of all types of potential obstructions. No payment shall be made for any inefficient time, idle time, or time not spent removing the obstruction due to the Contractor's failure to have readily available equipment, tools, materials, and labor.

3.9 SETTLEMENT MONITORING PROGRAM

- A. The Contractor shall engage an independent, Commonwealth of Massachusetts registered professional land surveyor to provide a detailed horizontal and vertical settlement monitoring program during the jacking operation to assure no settlement has occurred to existing railroad, sidewalks, utilities, structures, or buildings.
- B. Settlement Monitoring Program shall be in accordance with Section 02017 – GEOTECHNICAL INSTRUMENTATION AND MONITORING.

3.10 CLEAN UP

- A. The Contractor shall clean up the Site during each phase or operation and upon completion of the Work. The Contractor shall load, transport, and dispose of all surplus excavated materials and debris at no additional cost to the Owner.

END OF SECTION 02340

SECTION 02538

TEMPORARY BY-PASS SEWAGE PUMPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS and other DIVISION 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Furnish, install, field test, and operate temporary by-pass pumping systems for the purpose of diverting sewage flow around work areas for the duration of the project. The pumping system shall protect against surcharging of the existing sewer system upstream of the work area by installing adequate temporary by-pass pumping to handle dry weather and wet weather flows. Provide all labor, tools, materials, and equipment necessary to by-pass flow around the work areas.
- B. The design, installation, and operation of temporary by-pass pumping systems shall be the Contractor's responsibility. The Contractor shall provide the services of a professional by-pass company who can demonstrate to the Owner and Engineer that the company specializes in the design and operation of temporary by-pass pumping systems. The by-pass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. By-passing operations shall be continuously monitored by the Contractor, regardless of duration or timing of by-passing. By-passing should be coordinated with low-flow times, to the extent feasible. Restore normal service to entire system at the end of normal working hours every day or post an attendant on-site. No unattended by-pass pumping will be allowed.
- D. Maintain temporary by-pass pumping system so that they are completely functional throughout the required period of service.
- E. Provide all maintenance including manufacturer recommended preventative maintenance and on-call repair services. Contractor shall provide repair services and/or replacement equipment 24 hours per day, 7 days per week within 4 hours of being notified.
- F. The Contractor shall not allow sewage flow to discharge to any salt or fresh water body by means of overflow, by-pass pumping, or any other method that may contaminate these water areas.
- G. Except as specifically permitted, the installation of the by-pass pipelines is prohibited in all saltmarsh/wetland areas. The pipeline must be located off streets and sidewalks

and on shoulders of the roads. When the by-pass pipeline crosses local streets and private driveways, the Contractor must place the by-pass pipelines in trenches and cover with temporary pavement. Upon completion of the by-pass pumping operations, and after the receipt of written permission from the Engineer, the Contractor shall removal all the piping, restore all property to pre-construction condition, and restore all pavement. The Contractor is responsible for obtaining any approvals from the Owner for placement of the temporary pipeline within public ways.

H. Related Sections: The following sections contain requirements that relate to this Section:

1. Section 02570 – Site Sewer
2. Appendix H – Sewer Meter Records

1.3 SUBMITTALS

A. Submit the following in accordance with the Conditions of Contract and Division 1 Specification Sections and as specified herein:

1. A detailed description of the proposed pumping systems, project approach, and requirements herewithin stamped by a Professional Engineer in the State of Massachusetts.
2. A minimum of five reference installations of projects with similar size in wastewater by-pass pumping applications. Include contact names and phone numbers.
3. A detailed description of each proposed temporary by-pass pumping system including pumps, pump drives, piping, hoses, valves, fittings, controls, wiring, and other ancillary accessories required to provide a complete operating system.
4. Complete list of system components to be provided.
5. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
6. Performance data for each type of equipment that will show compliance with specification requirements stated herein.
7. Detailed plans and sections showing the proposed pumping system layout including dimensions and elevations. Plan shall include but not limited to the following:
 - a. Staging area and access requirements for all pumps.
 - b. Number, size, material, location, and method of installation of suction piping.

- c. Number, size, material, location, and method of installation of discharge piping.
- d. Sewer plugging method and types of plugs.
- e. Pump size, capacity, number of units, diesel engine specifications, fuel tank capacity, fuel consumption requirements, and method of refueling.
- f. Calculations of static lift, pipe size selection, friction losses, flow velocity, and pump selection.
- g. Provide pump performance curves showing they meet calculated requirements for head, capacity, and NPSH.
 - h. Proposed method of freeze protection.
 - i. Proposed method of noise control for each pump with external dBA value.
 - j. Temporary pipe supports, anchorage, cover material, and other accessories as required to stabilize the piping system.
 - k. Proposed pump controls and alarm panel and system for remote transmittal of alarms.
 - l. A description and schedule for dismantling the by-pass system, and restoring normal operations.
- 8. Installation schedule and maintenance schedule.
- 9. Contact phone number and pager number for 24-hour service.
- 10. Recommend spare parts to be stored on-site for emergency maintenance.
- 11. Emergency response plan describing the intended means of handling but not limited to the following:
 - a. Break or failure of by-pass piping.
 - b. Failure of by-pass pump.
 - c. Overflows.
 - d. Backup into dwelling or onto private property.
 - e. Operations during inclement weather including snow storms.
- 12. Procedures for start-up and testing of the by-pass pumping system to demonstrate compliance with specified automatic operation and maintenance requirements.
- 13. Field inspection reports.
- 14. Recommendations for short- and long-term storage.

1.4 QUALITY ASSURANCE

- A. Provide in accordance with Section 01400 - Quality Assurance and as specified.
- B. The Contractor shall employ the services of a professional by-pass pumping company who can demonstrate five years of recent and continuous specialization in the design, installation, operation, and removal of temporary by-pass pumping systems in wastewater applications. The complete system shall be furnished from a single vendor who shall be capable of providing service staff, repair parts and replacement of any deficient system component within 4 hours of a service call, twenty-four hours per day, and seven days per week.
- C. The by-pass pumping system shall be standard equipment and totally suited for the application as detailed herein. The equipment to be furnished shall be satisfactory and safely designed, in accordance with the design parameters as detailed in these contract documents. It shall be constructed for continuous, automatic operation, for extended periods of time.
- D. All items shall be designed and constructed in full accordance with all applicable state and local codes and regulations. Labor, materials, and costs required to meet state codes shall be the responsibility of the Contractor and the professional by-pass pumping company.
- E. Provide services of factory-trained professional by-pass pumping company representative, specifically trained on type of equipment specified:
 - 1. Man-day requirements listed exclusive of travel time, and do not relieve Contractor of obligation to provide sufficient service to place equipment in satisfactory operation.
 - 2. Installation and Start-up/Testing: Sufficient time to assist in location of pumping system; coordination of piping, electrical, miscellaneous utility connections; calibration, testing and start-up, but not less than:
 - a. 1 day per pumping system set-up
 - 3. Credit to the Owner unused service man-days specified above, at published field service rate plus travel costs.

1.5 FLOW DATA

- A. The entire project area consists of active sanitary sewers; therefore, flows and flow data are variable depending on location and conditions. It is the responsibility of the Contractor to maintain flows in accordance with this specification under all flow conditions and, therefore, the Contractor is encouraged to visit the project locations prior to Work to visually inspect flow conditions.

- B. Portions of the project are subjected to tidal infiltration and inflow. The Contractor is required to account for tide elevations, tide cycles, and tidal I/I volume in the planning, bidding, and conduct of the work.
- C. Sewer meter records from the MWRA's WY-6C meter (upstream of project area on the LCI Sewer) are provided in Appendix H for the Contractor's convenience. This information is not guaranteed and the Contractor is required to size bypass pumps to handle actual flows at the time the work is performed.
- D. Calculations of peak flows, pump rates, pump curves, and other relevant design data shall be provided by the Contractor prior to commencing the work. One by-pass pumping plan will be required at each by-pass location. Each by-pass pumping plan shall be stamped by a Massachusetts Registered Professional Engineer in accordance with Paragraph 1.3.

PART 2 - MATERIALS

2.1 PUMPING EQUIPMENT

- A. Furnish pumping units and all accessories from a single vendor. Each temporary by-pass pumping system shall be complete including pumps, drives, piping, piping headers, valves, flow meter, controls, and appurtenances as required for a complete system.
- B. The pumps, drives, and controls shall be designed and built for 24-hour continuous service at any and all points within the required range of operation, without overheating, without cavitation, and without excessive vibration or strain. All parts shall be so designed and proportioned as to have the strength, stability, and stiffness and be constructed to meet the specified requirements. Methods shall be provided for inspection, repairs, and adjustment.
- C. All equipment shall be suitable for outdoor operation under adverse weather conditions. Provide protection from freezing as required to maintain system operation.
- D. All pumps shall be centrifugal, end suction, fully automatic self-priming units that do not require the use of foot-valves, vacuum pumps, diaphragm pumps, or isolation valves or float apparatus in the priming system. Pump seals shall be high pressure, mechanical self-adjusting type with solid carbide faces capable of withstanding suction pressures to 100 psi without the pump running. The mechanical seal shall be cooled and lubricated in an oil bath reservoir, requiring no maintenance or adjustment. The oil bath reservoir shall not come in contact with or leak into the pumped water. Each pump shall be capable of running dry, with no damage for extended periods of time. All pump seal metal parts shall be stainless steel. All elastomers shall be Viton.

- E. Each pump shall be driven by a diesel engine. Diesel engine shall be water cooled. Each pump and diesel engine shall be skid mounted with integral fuel tank and skid lifting bracket.
- F. Provide automatic start/stop controls for the pumping system to automatically maintain system flow. Controls shall be contained in a local NEMA 4 rated control panel with provision to manually operate each pump, provide indication of pump operation, and indicate the total flow being pumped. The pump control panel shall include high/low water level alarms and remote auto-dialer to send alarms to a minimum of four telephone numbers.
- G. Pumps shall be provided with noise protective acoustically-silenced enclosures that meet all local, MA DEP, and Town of Weymouth construction noise requirements and as a minimum: 80 dBA at seven feet; 65 dBA at thirty feet; 60 dBA at nearest residence; and less than 10 dBA raised above background levels; and no pure tone condition. Contractor shall be responsible for all materials, labor, and equipment to show compliance with the above requirements.

2.2 ADDITIONAL EQUIPMENT

- A. Provide all required suction and discharge pipe and fittings, discharge manifold pipe and fittings, shutoff valves, check valves, flow meter, pressure regulating valves, insulation, freeze protection, and all required accessories.
- B. All pipe and fittings shall be steel with flanged or quick connect coupling connections, or high density polyethylene pipe with fused joints. All joints must be 100 percent restrained. Suction piping shall be rated for 25-in Hg vacuum. Discharge piping, fittings, connections, valves, and other discharge piping accessories shall be rated for a minimum working pressure of 150 psi.
- C. Lay flat hose shall be extra heavy duty, highly abrasive resistant and fitted with gasketed couplings. Hose shall be rated for a minimum working pressure of 150 psi.
- D. Aluminum "irrigation" type piping or glued PVC pipe will not be allowed.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or equipment breakdown. One stand-by pump for each size pump utilized shall be installed and piped into the suction and discharge manifold at the by-pass pump, ready for automatic start and use in the event of primary pump failure.
- B. The Contractor shall adequately handle all flow, even instantaneous peak flows, without damage or overflow. The Contractor shall make himself aware of potential large instantaneous flow contributors connected to the sewer.

- C. The Contractor shall remove manhole sections or make connections to the existing and construct temporary by-pass pumping structures only at the access locations indicated on the Drawings and maybe required to provide adequate suction conduit.
- D. Plugging or blocking of sewage flows shall incorporate primary and secondary plugging devices. When plugging or blocking is no longer needed for performance and acceptance or Work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.
- E. Provide 1-inch minimum thick, tight plywood covers over by-pass discharge and suction manholes. Pipes to be sealed with foam rubber collar and sealed around all pipe penetrations.
- F. All by-pass pipes shall be buried at all driveway and street crossings.
- G. Contractor shall provide chain-link fence enclosures to secure pumping systems.
- H. The by-pass pumping system shall not require excavation to reduce the suction lift without approval of the Engineer. Pumps may not be benched down to make the suction lift unless approved by the Engineer.
- I. The Contractor shall exercise caution and comply with OSHA requirements when working in the presence of gases, combustible or oxygen-deficient atmospheres, and confined spaces.

3.2 DELIVERY, STORAGE AND HANDLING

- A. Provide in accordance with Section 01610 - Delivery, Storage, and Handling and as specified herein. Ship equipment, materials and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.
- B. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended.
- C. Deliver spare parts at same time as pertaining equipment.
- D. Store and safeguard equipment, material, and spare parts.

3.3 INSTALLATION

- A. Installation shall be in accordance with the professional by-pass pumping company recommendations and approved shop drawing submittals.
- B. Install pumping units on a firm level surface.

- C. Equipment failing to meet specific conditions shall be removed and replaced at no additional cost to the Owner.

3.4 FIELD TEST AND QUALITY CONTROL

- A. The Contractor shall have the professional by-pass pumping company factory representative present during field installation. It shall be the Contractor's responsibility to obtain the recommended installation procedures directly from the company, and comply with same.
- B. Contractor shall have professional by-pass pumping company provide a factory service representative who has complete knowledge of the operation of the pumps, including mechanical, electrical, control, and alarm components as necessary to perform field testing and initial start-up to assure and demonstrate the proper performance of all equipment and components.
- C. Field tests shall be performed by the Contractor under the instruction of the factory service engineer. All field testing to be witnessed by the Engineer in the field. Provide a minimum of seven (7) days notice prior to all field tests. Submit certification of successfully conducted field tests.
- D. The Contractor shall perform leakage and pressure tests of the by-pass pumping discharge piping using clean water prior to actual operation. Field testing shall demonstrate a minimum of 8 hours of continuous operation. During the 8 hours of continuous operation, the system shall demonstrate the ability to automatically start and stop pumps in response to changing flow conditions.
- E. In the event that a unit fails to pass a test, make all modifications required to place the unit in proper working order.
- F. In the event that a unit fails a test a second time, remove the unit and replace with a satisfactory one, at no cost to the Owner.
- G. The Contractor shall provide all necessary instrumentation, equipment, devices, and appurtenances, as well as temporary wiring or piping, required to perform field tests.

3.5 SYSTEM OPERATION

- A. The by-pass pumping operations must be attended at all times. Unattended by-pass will not be allowed. If by-pass pumping must continue past working hours an attendant must be present at all times.
- B. Perform all required maintenance on the equipment to maintain the system integrity and capacity as specified.
- C. Provide clean-up and disposal of contaminated material and reporting for all product spills.

- D. At the completion of the period of service, disconnect all temporary piping and remove all system components from the site. Restore the work site to its original condition

3.6 CONTRACT CLOSEOUT

- A. Provide in accordance with Section 01700 - Contract Closeout.

END OF SECTION 02538

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SECTION 02570

SITE SEWER

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies requirements for the proposed sewer gravity lines and manhole structures and associated items.
- B. The work includes furnishing and installing sewer pipes, manholes, and other structures and appurtenances required and in accordance with the Drawings and Specifications.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, and:
 - 1. Section 02140 – Dewatering and Discharge
 - 2. Section 02160 – Temporary Excavation Support System
 - 3. Section 02200 – Earthwork

1.3 SUBMITTALS

- A. List of materials proposed and manufacturers' specifications and installation instructions.
- B. Shop drawings for all material and structures prior to ordering materials, including pipe materials, fittings, connections, sewer manholes, frames and covers, and component construction, features, configuration, and dimensions.

1.4 INSPECTION

- A. All sewer pipe may be inspected at the plant for compliance with these specifications by an independent testing laboratory selected and paid for by the Owner. The Contractor shall require the manufacturer's cooperation in these inspections.
- B. Inspection of the pipe may also be made after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though pipe samples may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the site at once.

- C. Imperfections in materials may be repaired, subject to approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval.

1.5 DELIVERY, STORAGE & HANDLING

- A. All materials shall be adequately protected from damage during transit. Pipes shall not be dropped.
- B. All pipe and other appurtenances shall be inspected before placement in the work and any found to be defective from any cause, including damage caused by handling, and determined by the Engineer to be unrepairable, shall be replaced at no cost to the Owner.
- C. Storage and handling of pipes, manholes and other sewer system appurtenances shall be in accordance with the manufacturer's recommendations, subject to the approval of the Engineer.
- D. Only nylon-protected slings shall be used for handling the pipe. No hooks or bare cables will be permitted.
- E. Pipe shall be stored above ground at a height no greater than 5 feet, and with even support for the pipe barrel.

PART 2 - PRODUCTS

2.1 SEWER PIPE

- A. Gravity Pipe and Fittings: Gravity pipe shall be SDR 35 (PS46) PVC, Sanitite® HP, Hobas®, Vylon® PVC or engineer approved equal. Gravity sewer pipe shall meet the requirements ASTM D3034, ASTM F679, ASTM F2764, ASTM D3262, ASTM F1803, as applicable to pipe material.
- B. Joints: Rubber rings shall conform to ASTM F477. Rubber rings capable of withstanding continuous submergence in saltwater. Rubber rings shall provide a tight seal that protects the line from shock and vibration, and compensates for expansion and contraction of pipe lengths. Gasketed joints shall meet the requirements of ASTM D3212.
- C. Service Connections: Service connections shall be made with Inserta Tee®, Inserta Wye™, or engineer approved equal.

2.2 WATER TIGHT FIBERGLASS MANHOLES

- A. General: Fiberglass reinforced polyester manhole shall be manufactured from commercial grade polyester resin or other suitable polyester or vinyl ester resins with fiberglass reinforcements. Manhole shall be a one piece unit manufactured to meet or

exceed specifications of ASTM D-3753. Manhole shall be manufactured by L.F. Manufacturing or approved equal.

- B. Reinforcing: Reinforcing materials shall be commercial Grade “E” type glass in the form of continuous roving and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
- C. Interior Surface: The interior surface exposed to the chemical environmental shall be a resin-rich layer of 0.010 to 0.020 inch thick. The inner surface layer exposed to the corrosive environment shall be followed with a minimum of two passes of chopped roving of minimum length 0.5 inch to maximum length of 2.0 inch and shall be applied uniformly to an equivalent weight of 3 oz/ft. Each pass of chopped roving shall be well rolled prior to the application of additional reinforcement. The combined thickness of the inner surface and interior layer shall not be less than 0.10 inch.
- D. Wall Construction Procedure: After the inner layer has been applied the manhole wall shall be constructed with chop and continuous strand filament wound manufacturing process, which insures continuous reinforcement and uniform strength and composition. The cone section, if produced separately, shall be affixed to the barrel section at the factory with resin-glass reinforced joint resulting in a one-piece unit. Seams shall be fiberglassed on the inside and the outside using the same glass-resin jointing procedure. Field joints shall not be acceptable by anyone other than manhole manufacturer.
- E. Exterior Surface: For a UV inhibitor the resin on the exterior surface of the manhole shall have gray pigment added to a minimum thickness .125 inches.
- F. Stubouts and Connections: Kor-N-Seal boots may be installed by the manhole manufacturer using fiberglass reinforced pipe stubouts for the Kor-N-Seal boot sealing surface.
- G. Manhole Bottom: Fiberglass manholes will be required to have resin fiber-reinforced bottom. Deeper manholes may require a minimum of two fiberglass channel stiffening supports. All fiberglass manholes manufactured with a fiberglass bottom will have a minimum 3-inch wide anti-flotation ring. The manhole bottom shall be a minimum of ½ inch thick.
- H. Fiberglass enclosed invert and bench area: A fiberglass enclosed invert and bench area shall be installed in the manhole by the manufacturer. The invert will be formed using a non-corrosive material and completely enclosed in a minimum 1/4-inch layer of fiberglass chop.
- I. Height Adjustment: Fiberglass manholes must have the ability to be height adjustable with the use of a height adjustment ring. Height adjustment can be made as a field operation without the use of uncured resins or fiberglass lay-ups. Fiberglass manholes must maintain all load and soundness characteristics required by A.S.T.M. D3753 after height adjustment has occurred.

- J. Fillers and Additives: Fillers, when used, shall be inert to the environment and manhole construction. Sand shall not be accepted as an approved filler. Additives, such as thixotropic agents, catalysts, promoters, etc., may be added as required by the specific manufacturing process to be used to meet the requirements of the A.S.T.M D-3753 standard. The resulting reinforced-plastic material must meet the requirements of this specification.
- K. Anti-Flotation: All manholes shall include a concrete anti-flotation ring that shall be submitted in accordance with paragraph 1.3. Anti-flotation ring shall be a minimum of 1 foot thick steel reinforced concrete refer to construction details. Ring shall extend at least 12 inches off sidewall of manhole. Reinforcing steel shall be #5 rebar 12 inches on center each way. Concrete shall be 4,000 psi and design mix shall include additive for corrosion resistance to salt water.
- L. Manufacture: Manhole cylinders, manway reducers, and connectors shall be produced from fiberglass-reinforced polyester resin using a combination of chop and continuous filament wound process.
1. Interior Access: All manholes shall have an internal step system consisting of polypropylene encased steel steps bolted through the wall of the manhole. The nuts shall be glass encased for leak prevention.
 2. Manway Reducer: Manway reducers shall be eccentric.
 3. Cover and Ring Support (Traffic Rated): The manhole shall provide an area from which a grade ring (concrete or HDPE) can be installed to accept a composite frame and cover and have the strength to support a traffic load without damage to the manhole. A minimum of 6 inch of grade rings shall overhang the shoulder of the manhole by at least 1 inch to transfer the load from traffic to the sidewall of the manhole. Frame and cover shall be watertight. Traffic rated frames and covers shall be field installed.
- M. Requirements:
1. Exterior Surface: The exterior surface shall be relatively smooth with no sharp projections. Handwork finish is acceptable if enough resin is present to eliminate fiber show. The exterior surface shall be free of blisters larger than 0.5 inch in diameter, de-lamination or fiber show.
 2. Interior Surface: The interior surface shall be resin rich with no exposed fibers. The surface shall be free of crazing, de-lamination, blisters larger than 0.5 inch in diameter, and wrinkles of 0.125 inch or greater in depth. Surface pits shall be permitted if they are less than 0.75 inch in diameter and less than 0.0625 inch deep. Voids that cannot be broken with finger pressure and are entirely below the resin surface shall be permitted if they are less than 0.5 inch in diameter and less than 0.0625 inch thick.
 3. Wall Thickness: Fiberglass manholes 72" in diameter and greater and up to 20 feet in depth will have a minimum wall thickness of 0.5 inches. External

rib reinforcement may be required based on manhole manufacturer recommendation based on depth of installation.

4. Repairs: Any manhole repairs are subject to meet all requirements of this specification.
5. Manhole Length: Manhole lengths shall be in 6-inch increments +/- 2 inches.
6. Diameter Tolerance: Tolerance of inside diameter shall be +/- 1% of required manhole diameter.
7. Load Rating: The complete manhole shall have a minimum dynamic-load rating of 16,000 lbs. when tested in accordance with A.S.T.M. 3753 8.4 (note 1). To establish this rating the complete manhole shall not leak, crack, or suffer other damage when load tested to 40,000 lbs. and shall not deflect vertically downward more than 0.25 inch at the point of load application when loaded to 24,000 lbs.
8. Stiffness: The manhole cylinder shall have the minimum pipe-stiffness values shown in the table below when tested in accordance with A.S.T.M. 3753 8.5 (note 1).

<u>LENGTH - FT.</u>	<u>F/AY - PSI</u>
3 - 6.5	0.75
7 - 12.5	1.26
13 - 20.5	2.01
21 - 25.5	3.02
26 - 35	5.24

9. Soundness: In order to determine soundness, the manufacturer shall apply an air or water pressure test to the manhole test sample. Test pressure shall not be less than 3 psig or greater than 5 psig. While holding at the established pressure, inspect the entire manhole for leaks. Any leakage through the laminate is cause for failure of the test. Refer to A.S.T.M. 3753 8.6.
10. Chemical Resistance: The fiberglass manhole and all related components shall be fabricated from corrosion proof material suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with the wastewater collection system.

N. Physical Properties:

	Hoop Direction	Axial Direction
Tensile Strength (psi)	18,000	5,000
Tensile Modules (psi)	0.6 x 10 ⁶	0.7 x 10 ⁶
Flexural Strength (psi)	26,000	4,500
Flexural Modules (psi)	1.4 x 10 ⁶	0.7 x 10 ⁶
Compressive (psi)	18,000	10,000

- O. Shipping and Handling: Do not drop or impact the fiberglass manhole. Fiberglass manhole may be lifted by inserting a 4"x4"x30" timber into the top of manhole with cable attached or by a sling or "choker" connection around the center of manhole, lift as required. Use of chains or cables in contact with the manhole surface is prohibited.
- P. Frame and Cover: Provide watertight fiber reinforced polymer frame and cover, with the word "SEWER" embossed on cover. Letter size shall be three inches. Covers shall be lockable to frame.

2.3 PRECAST CONCRETE MANHOLES

- A. Structure: Four feet (4') minimum inside diameter precast units (4,000 psi minimum compressive strength) with eccentric cone section tapering to twenty-four inch (24") diameter (minimum), or flat top as required, and one pour monolithic base section conforming to ASTM C478. All units shall be designed for HS-20 loading. Flat tops shall be used where manholes are less than eight feet (8') deep or as shown on the drawings. Manhole wall thickness shall be 5 inches, minimum.
- B. Precast Unit Joint Seals: Preformed butyl mastic sealant conforming to ASTM C990. Joint seal shall fill 75% of the joint cavity.
- C. The date of manufacture, trademark and name of the manufacturer shall be clearly marked on the inside of each precast section.
- D. Frame and Cover: Provide heavy duty cast iron frame and cover conforming to ASTM A48 Class 35B, with the word "SEWER" embossed on cover. Letter size shall be three inches. Standard manhole frames and covers for gravity sewer shall be 24" x 8" EJ Product No. 00159043 cover and EJ Product No. 00159011 frame.

2.4 CORROSION PROTECTIVE COATING (EPOXY LINER)

- A. The corrosion protective coating for concrete sewer manholes as depicted in the drawings shall be a 100% solids, solvent-free two-component epoxy resin system thixotropic in nature and filled with select fillers to minimize permeability and provide sag resistance acceptable to the following specifications:

Volatile Organic Compounds (vol %)	ASTM D2584	0%
Flexural Strength	ASTM D790	13,000 psi
Compressive Strength	ASTM D695	18,000 psi
Tensile Strength	ASTM D638	7,600 psi
Tensile Elongation	ASTM D638	1.50 %
Hardness, Type D	ASTM D2240	88
Adhesion	ASTM D4541	>Tensile Strength of Concrete (substrate failure)
Chemical Resistance	(ASTM D543)	Sulfuric Acid, 10% Immersion Service

2.5 PIPE CONNECTIONS

- A. Manholes: Flexible sleeve or rubber gaskets shall be Lock Joint, Kor-N-Seal, A-Lok or approved equal.
- B. Pipes: Flexible Couplings shall be strongback type PVC repair couplings for sewer services. Repair couplings shall be of same type and class of materials as pipe. Fitting must have single piece gasket.

2.6 PIPE ANCHORS

- A. Pipe anchors shall be manufactured of precast concrete. Concrete shall be minimum strength 3,000 psi at 28 days. Concrete design mix shall have additive for corrosion resistance for exposure to salt water.
- B. Steel reinforcement shall be in accordance with ASTM A615, grade 60.
- C. Anchors shall be two-piece design.

2.7 BENTONITE DAMS

- A. The bentonite clay shall be granular and high swelling. High swelling is defined as the ability for 2 grams of the base bentonite, when mechanically reduced to 100 mesh, to swell in water to a volume of 16 cc or greater, when added to 100 cc distilled water.
- B. The sand shall be a fine aggregate consisting of natural sand, manufactured sand or combination thereof. The sand shall be free of injurious amounts of organic impurities and shall conform to ASTM C33, Concrete aggregate.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILLING

- A. The type of materials to be used in bedding and backfilling and the method of placement shall conform to the requirements of Section 02200– Earthwork, and the details shown on the Drawings.

3.2 PIPE INSTALLATION

- A. All sewer piping shall be laid accurately to the lines and grades shown in the Drawings and in conformance with pipe manufacturer's recommended procedures.
- B. Laying Pipe: Each length of pipe shall be laid with firm, full and even bearing throughout its entire length, in a prepared trench. Pipe shall be laid with bells up grade unless otherwise approved by the Engineer.

Every length of pipe shall be inspected and cleaned of all dirt and debris before being laid. The interior of the pipe and the jointing seal shall be free from sand, dirt and trash. Extreme care shall be taken to keep the bells of the pipe free from dirt and rocks so that joints may be properly lubricated and assembled.

No length of pipe shall be laid until the proceeding lengths of pipe have been thoroughly embedded in place, to prevent movement or disturbance of the pipe alignment.

Lay accurately to lines and grades indicated or required. Provide accurate alignment, both horizontally and vertically.

- C. Pipe Extension: Where an existing pipe is to be extended, the same type of pipe shall be used, unless otherwise approved by the Engineer.
- D. Full Lengths of Pipe: Only full lengths of pipe shall be used in the installation except that partial lengths of pipe may be used at the entrance to structures, and to accommodate the required locations of service connection fittings.
- E. Pipe Entrances to Structures: All pipes entering structures shall be cut flush with the inside face of the structure, and the cut ends of the pipe surface within the structure shall be properly rounded and finished so that there will be no protrusion, ragged edges or imperfections that will impede or affect the hydraulic characteristics or the sewage flow. The method of cutting and finishing shall be subject to the approval of the Engineer.
- F. Protection During Construction: The Contractor shall protect the installation at all times during construction, and movement of construction equipment. Vehicles and loads over and adjacent to any pipe shall be performed at the Contractor's risk and in accordance with all applicable federal, state and local safety regulations.

At all times when pipe laying is not in progress, all open ends of pipes shall be closed by approved temporary water-tight plugs. If water is in the trench when work is resumed, the plug shall not be removed until the trench has been properly dewatered and all danger of water entering the pipe eliminated. The Contractor is responsible for proper dewatering to ensure a stable pipe foundation. Proper dewatering to two feet (minimum) below the pipe invert to ensure joining of the pipe in a dry condition.

- G. Bentonite Dams: Bentonite dams shall be installed every 300 linear feet of sewer inclusive of manholes and appurtenances. The dams shall extend from undisturbed material at the bottom of the trench excavation to three feet below the final finished grade or as directed by the Engineer. The dam shall extend the full width of the trench and the length of the dam shall be a minimum of 1.5 feet along the laying length of the pipe.

3.3 PIPE JOINTS

- A. All joints shall be made watertight. Precast Concrete pipe anchors shall be installed at all pipe joints where less than 5 feet of cover is provided.

- B. Pipe shall be jointed in strict accordance with the pipe manufacturer's instruction. Jointing of all pipes shall be done entirely in the trench.
- C. PVC Pipe
 - 1. Lubricant for jointing of PVC pipe shall be applied as specified by the pipe manufacturer. Use only lubricant supplied by the pipe manufacturer.
 - 2. PVC pipe shall be pushed home by hand or with use of a bar and block. The use of power equipment, such as a backhoe bucket, shall only be used at the direction of the manufacturer.
 - 3. The position of the gasket shall be checked to insure the joint has been properly made and is watertight. Care shall be taken not to exceed the manufacturer's recommended maximum deflection allowed for each joint.
 - 4. Field-cut pipe ends shall be cut square and the pipe surface beveled to the size and shape of a factory-finished beveled end. All sharp edges shall be rounded off.

3.4 MANHOLES

- A. General Requirements: All manholes shall be built in accordance with the Details and in the locations shown on the Drawings. Structures shall be constructed of fiberglass. Personnel experienced and skilled in this work shall install all masonry, and any person not deemed to be such by the Engineer shall be removed and replaced by a person so qualified. Manholes shall be constructed as soon as the pipe laying reaches the location of the manhole. Should the Contractor continue laying pipe without making provisions for completion of the manhole, the Engineer shall have the authority to stop the pipe laying operations until the manhole is completed. The Contractor shall accurately locate each manhole and set accurate templates to conform to the required line and grade. Any manhole that is incorrectly located or oriented improperly shall be removed and rebuilt in its proper location, alignment and orientation at no additional cost to the Owner.
- B. Foundations: All manholes shall be constructed on a 12 inch (minimum) layer of crushed stone with filter fabric bedding material. The excavation shall be dewatered to provide a dry condition while placing bedding material and setting the base.
- C. Watertight Fiberglass Manholes:
 - 1. FRP manholes shall be installed only after Shop Drawings have been approved. In traffic areas the top grade of the fiberglass cone section shall be set sufficiently below finished grade to permit a minimum of 6 inches of concrete or HDPE grade rings to adjust the grade of the manhole frame. Manhole frames shall be set on a grout pad to make a watertight fit. Grade rings shall extend a minimum of 1 inch beyond the shoulder of the manhole

to transfer the load to the manhole sidewall. Traffic rated frame and cover sets shall be field installed.

2. Bottom of excavation should be compacted to 95% Standard Proctor Density. Reinforced concrete anti-flotation ring shall be manufactured in accordance with manhole manufacturer's recommendations and then placed over the anti-flotation flange. The concrete shall be a minimum of one foot deep and two feet from outside wall of the manhole. More concrete may be required in high water table areas.
3. Backfill Material: Unless shown otherwise on drawings and approved by the Engineer, sand, crushed stone, or pea gravel shall be used for backfill around the manhole for a minimum distance of one foot from the outside surface and extending from the bottom of the excavation to the top of the reducer section. Suitable material chosen from the excavation may be used for the remainder of the backfill. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction. This material will be subject to approval by the Engineer.
4. Backfill Procedure: Backfill shall be placed in layers of not more than 12 loose measure inches and mechanically tamped to 95% Standard Proctor Density, unless otherwise approved by the engineer. Flooding will not be permitted. Backfill shall be placed in such a manner as to prevent any wedging action against the fiberglass manhole structure.
5. Marking and Identification: Each manhole shall be marked on the inside and outside with the following information:
 - a. Manufacturer's name or trademark
 - b. Manufacturer's factory location
 - c. Manufacturer's serial number
 - d. Total manhole depth.

3.5 CONNECTIONS TO EXISTING FACILITIES

- A. General Requirements: The Contractor shall make all required connections of the proposed sewer into existing sewer system, where and as shown on the Drawings and as required by the Engineer.
- B. Compliance with Requirements of Owner of Facility: Connections into existing sewer facilities shall be performed in accordance with the requirements of the Owner of the facility. The Contractor shall comply with all such requirements, including securing of all required permits, paying the costs thereof, and providing twenty-four (24) hour notice prior to beginning the work.

3.6 PIPE CONNECTIONS TO NEW STRUCTURES

- A. Pipe connections for fiberglass structures may be accomplished by the method described below. The Contractor shall make sure that the outside diameter of the pipe is compatible with the particular pipe connection used.
 - 1. KOR-N-SEAL (or approved equal) neoprene boot cast into the manhole wall. The stainless steel clamp shall be protected from corrosion with a bitumastic coating.
 - 2. LOCK-JOINT (or approved equal) rubber-like flexible sleeve cast into the manhole wall. The stainless steel clamp shall be protected from corrosion with a bitumastic coating.
- B. Sewer manholes shall be constructed with interior drop connections when the proposed invert of the connection is at least two feet nine inches (2'-9") above the manhole invert. Drop connections for differences of less than two feet nine inches (2'-9") shall also be provided if approved by the Engineer.
- C. Each manhole pipe connection shall begin with a five-foot (5') stub prior to laying a full section of pipe. Pipe stubs for future connections shall be installed in the locations shown on the drawings and the stub ends shall be sealed with a watertight plug.

3.7 FIELD TESTING OF SEWER GRAVITY MAIN AND MANHOLES

- A. On completion of a section of sewer, including building connections installed to the property line, the Contractor shall install suitable bulkheads as required, dewater and test the sewer for leakage.
- B. Unless otherwise approved, the section shall be tested using low pressure air test procedures. If circumstances permit, the Engineer may allow testing by infiltration or exfiltration in lieu of air testing. An air vacuum test at 10 inches of mercury for 5 minutes may be allowed for manhole tests in lieu of low pressure air tests.
- C. The air test procedures shall conform to the Uni-Bell Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe, UNI-B-6. The starting air pressure for the test shall be 4 psi. The minimum duration permitted for the prescribed low pressure air exfiltration pressure drop between two consecutive manholes shall not be less than provided in Table I or Table II of UNI-B-6.
- D. The pipeline shall be made as nearly watertight as practicable, and leakage tests and measurements shall be made after the pipeline has been backfilled. Where the groundwater level is more than 1 ft. above the top of the pipe at its upper end, the Contractor, with the authorization of the Engineer, conduct either infiltration tests or low pressure air test. Where the groundwater level is less than 1 ft. above the top of the pipe at its upper end, the Contractor, with the authorization of the Engineer, shall conduct either exfiltration tests or low pressure air tests. At the time of the test, the Contractor shall determine the groundwater elevation from observation wells, excavations or other means, all subject to review by the Engineer.
- E. For making the low pressure air tests, the Contractor shall use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low pressure air. The equipment shall be provided with an air regulatory valve or air safety so set that the internal air pressure in the pipeline cannot exceed 8 psig.
- F. The leakage test using low pressure air shall be made on each manhole-to-manhole section of pipeline after placement of the backfill. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
- G. All air used shall pass through a single control panel.
- H. Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig. greater than the maximum pressure exerted by the groundwater that may be above the invert of the pipe at the time of the test. However, the internal air pressure in the sealed line shall not be allowed to exceed 8 psig. When the maximum pressure exerted by the groundwater is greater than 4 psig, the Contractor shall conduct only an infiltration test. At least two minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low pressure air supply hose shall be quickly disconnected from the control panel. The time required in minutes for the pressure in the section under test to decrease from 3.5

to 2.5 psig. (greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe) shall not be less than that shown in the following table:

Pipe diameter in inches	Minutes
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	9.0
21	10.0
24	11.5
27	13.0
42	20.0

- I. For making the infiltration and exfiltration tests, the Contractor shall furnish suitable test plugs, water pumps, and appurtenances, and all labor required to properly conduct the tests on sections of acceptable length.
- J. For making the infiltration tests, under drains, if used, shall be plugged and other groundwater drainage shall be stopped to permit the groundwater to return to its normal level insofar as practicable.
- K. Upon completion of a section of the sewer, the Contractor shall dewater it and conduct a satisfactory test to measure the infiltration for at least 24 hours. The amount of infiltration, including manholes, tees, and connections, shall not exceed 200 gal. per inch diameter per mile of sewer per 24 hours.
- L. For making the exfiltration tests, the sewers shall be subjected to an internal pressure by plugging the pipe at the lower end and then filling the pipelines and manholes with clean water to a height of 2 ft. above the top of the sewer at its upper end. Where conditions between manholes, may result in test pressures which would cause leakage at the stoppers in branches, provisions shall be made by suitable ties, braces, and wedges to secure the stoppers against leakage resulting from the test pressure. The rate of leakage from the sewers shall be determined by measuring the amount of water required to maintain the level 2 ft. above the top of the pipe.
- M. Leakage from the sewers under test shall not exceed the requirements for leakage into sewers as hereinbefore specified. The sewers, including, but not limited to mainlines, services, chimneys, and fittings, shall be tested before any connections are made to buildings. The Contractor shall construct weirs or other means of measurements as may be required. Suitable bulkheads shall be installed, as required, to permit the test of the sewer.
- N. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing leaks and retesting as the Engineer may require without additional compensation.
- O. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, acceptable modifications in the procedures shall be made

as required, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

3.8 FIBERGLASS MANHOLE FACTORY TESTING

- A. Test methods: All tests shall be performed as specified in ASTM 3753 section 8, test method D-790 (see note 5) and test method D-695.
- B. Quality Control: Each completed manhole shall be examined by the manufacturer for dimensional requirements, hardness, and workmanship. All required ASTM 3753 testing shall be completed and records of all testing shall be kept and copies of test report shall be presented upon formal written request within a reasonable time period.
- C. Certification: As a basis of acceptance, the manufacture shall provide an independent certification that consists of a copy of the manufacturer's test report and accompanied by a copy of the test results stating the manhole has been sampled, tested, and inspected in accordance with the provisions of this specification and meets all requirements. A certification shall be provided for each manhole provided.

3.9 CLEANING AND REPAIR

- A. The Contractor shall clean the entire sewer system of all debris and obstructions. This shall include removal of all formwork from structures, concrete and mortar droppings, construction debris and dirt. The system shall be thoroughly flushed clean and the Contractor shall furnish all necessary hose, pumps, pipe and other equipment that may be required for this purpose. No debris shall be flushed into existing sewers, storm drains or streams. All work of cleaning and repair shall be performed at no additional cost to the Owner.
- B. Patching of fiberglass manholes is prohibited. Leaking fiberglass manholes shall be replaced in their entirety.

3.10 DEFLECTION TESTING

- A. Allowable Deflection Test
 - 1. Pipe deflection measured not less than ninety days (90) after the backfill has been completed as specified shall not exceed five (5.0) percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
 - 2. Deflection shall be measured with a rigid mandrel (Go/No-Go) device cylindrical in shape and constructed with a minimum of nine or ten evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the Engineer for each diameter of pipe to be tested. The mandrel shall be hand pulled by the Contractor through all sewer lines.

3. Any section of sewer not passing the mandrel shall be uncovered at the Contractor's expense and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested.

3.11 FINAL INSPECTION

- A. Upon Completion of the work, and before final acceptance by the Engineer, the entire sewer system shall be subjected to a final inspection in the presence of the Engineer. The work shall not be considered as complete until all requirements for line, grade, cleanliness, leakage tests and other requirements have been met.

END OF SECTION 02570

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SECTION 02576

PAVEMENT REPAIR AND RESURFACING

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. This section includes the removal and replacement of existing bituminous pavement and sub-base; installation of temporary trench pavement; milling and pavement overlay; replacement of damaged curbing or sidewalks and installation of pavement markings that may be required as incidental work for the sewer installation.

1.2 RELATED WORK

- A. Earthwork specifications are included in Section 02200.

1.3 REFERENCE STANDARDS

- A. Except as otherwise specified herein, the current Standard Specifications for Highways and Bridges, including all addenda, issued by the Commonwealth of Massachusetts, Department of Public Works, shall apply to materials and workmanship required for the work of this Section.
- B. American Association of State Highways and Transportation Officials (AASHTO) AASHTO M144 - Standard Specification for Calcium Chloride.
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.4 SUBMITTALS

- A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTAL PROCEDURES.
 - 1. Product Data: Submit complete data on materials to be used in construction, including gradation tests for granular base.
 - 2. Design Data: Submit design mix for bituminous binder and top (wearing) course.
 - 3. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

1.5 QUALITY ASSURANCE

- A. Provide in accordance with Section 01400 and as specified.
- B. Laboratory Testing Required:
 - 1. The bituminous mixture shall be compacted to at least 95% of the density achieved on the laboratory testing of the design mix for the project. The density of the Bituminous Concrete Pavement will be determined by using either the following tests; Nuclear Density Gauge Method ASTM D2950 or the Bulk Specific Gravity Method AASHTO-T166.
- C. Thickness: Test in-place asphalt concrete courses for compliance with requirements for thickness. Repair or remove and replace unacceptable paving as directed by Engineer. In-place compacted thickness will not be accepted if exceeding the following allowable variation from required thickness:
 - 1. Binder Course: 1/4-inch, plus no minus
 - 2. Top Course: 1/4-inch, plus no minus

1.6 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Do not place materials when underlying surface is muddy, frozen, or has frost, snow, or water thereon.
 - 2. Do not place concrete when air temperature at time of placement, or anticipated temperature for following 24 hours, is lower than 40°F or higher than 90°F.
 - 3. Apply prime and tack coats when ambient temperature is above 50°F and when temperature has not been below 35°F for 12 hours immediately prior to application.
 - 4. Binder Course may be placed when air temperature is above 30°F and rising.
 - 5. Grade Control: Establish and maintain required lines and elevations.
- B. Existing Conditions:
 - 1. Drawings show approximate locations of paving areas.
 - 2. Drawings show approximate location of existing structures along pipeline route.

1.7 GUARANTEE

- A. All pavement placed shall be warranted by the Contractor for a period of two years. During this period all areas which have settled or are unsatisfactory for traffic shall be removed and replaced at no cost to the Town, including the cost of Traffic Police.

Settlement in excess of one (1) inch shall be considered significant, and shall be repaired.

1.8 PRICE ADJUSTMENT FOR HOT MIX ASPHALT MIXTURES

- A. The price paid to the Contractor for asphalt furnished and installed under this Contract shall be adjusted in accordance with the MassDOT “New Asphalt Period Price Method” (refer to MassDOT document 00811, dated 2/2/09).
- B. The price for liquid asphalt shall be as listed on the MassDOT website:

<http://www.massdot.state.ma.us/highway/DoingBusinessWithUs/Construction/PriceAdjustments.aspx>
- C. The “Base Price” shall be the price per ton of liquid asphalt on the date of the bid for this Contract. The “Period Price” shall be the price per ton of liquid asphalt on the date asphalt is actually placed under this Contract.
- D. An adjustment factor, representing the percentage increase or decrease in the “Period Price” compared to the “Base Price”, shall be applied to the “Materials” portion of the work. The Contractor shall only be paid for an adjusted unit price for “Materials”, not “Labor”.
- E. The asphalt content for hot mix asphalt mixtures shall be 5.5% (0.055) by weight regardless of percentages established by the Job Mix Formula as described in the Material Section M3.11.03 of the Massachusetts Highway Standard Specifications. The price adjustment will be a separate payment item. It will be determined by multiplying the number of tons of hot mix asphalt placed during the Period by the asphalt content percentage (0.055) times the variance in price between Base price and Period price of asphalt.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Calcium chloride shall conform to AASHTO M144, Type I or Type II.
- B. Bituminous concrete shall conform to Class I Bituminous Concrete Pavement, Type I-1, of Section 460 of the Massachusetts Highway Department Standard Specifications.
- C. Binder Course and Modified Top Course shall conform to the Massachusetts Highway Department Standard Specifications, Section M3.11.00, Class I, bituminous concrete.
- D. Bituminous concrete shall conform to the requirements of the Drawings..

- E. Tack coat shall be emulsified asphalt, grade RS-1 and conform to the Massachusetts Highway Department Standard Specifications, Section M3.03.0.
- F. Cutback asphalt shall conform to the Massachusetts Highway Department Standard Specifications, Section M3.02.0.
- G. Sub-base material for Town and Private Roads shall be new processed gravel conforming to the Massachusetts Highway Department Standard Specifications, Section M1.03.1 "Processed Gravel for Sub-Base".
- H. Pavement Markings
 - a. Pavement markings shall conform to the Massachusetts Department of Transportation Standard Specifications, Section 860 specified and Section M7.01 - Pavement Markings.
- I. Vertical granite curbing shall conform to the referenced specification, Section M9.04, granite type VA4.

PART 3 – EXECUTION

3.1 GENERAL

- A. After completion of the backfilling, final pavement shall not be placed until the trench pavement has been in place for at least 90 days, or a winter settlement period, unless otherwise directed in writing by the Engineer.
- B. Materials for pavement shall be mixed, delivered, placed, compacted, and tested in accordance with the referenced specification, Sections M3.11 and 460 and as specified herein.
- C. Whenever the sub-base becomes dry enough to cause dust problems, spread calcium chloride uniformly over the gravel surface in sufficient quantity to eliminate the dust.
- D. No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Engineer.
- E. Pavement Construction Period. No pavement shall be constructed during the period from November 15 to April 15, without approval in writing from the Engineer or Owner.

3.2 PREPARATION

A. Protection of Existing Roadways:

1. Saw cut or zipper existing pavement to required width and depth to avoid damage to adjacent pavement, curbs, gutters, or other structures and as indicated on the drawings.
2. Preparation for trench pavement shall include removing any temporary or existing pavement, saw cut all edges to keep the trench pavement edge neat and straight. Shape and compact subbase to 95 percent of maximum dry density as determined by ASTM D1557, Method C.
3. Trim loose edges of existing pavement. All abutting edges of the existing pavement shall then be coated with Bitumen for tack Coat RS-1 Emulsion immediately prior to the placement of the trench pavement.

B. Sub-Surface Preparation:

1. Pavement Sub-base:

- a. Pavement sub-base material shall be as specified in Section 02200, and as shown on the Drawings.
- b. The sub-base to be placed under pavement shall be a minimum of 12-inches thick after compaction. Sub-base shall be evenly spread and thoroughly compacted in accordance with the Contract Documents. The sub-base shall be spread in layers not more than 8 - inches thick except the last layer of gravel shall be 4-inches thick, compacted measure. All layers shall be compacted to not less than 95 percent of the maximum dry density of the material as determined by ASTM D1557 Method C at optimum moisture content.
- c. Complete sub-base preparation, including dynamic compaction, for full width before placing surfacing materials.

2. Subgrade:

- a. Prepare subgrade in accordance with Section 02200.
- b. Complete subgrade preparation, including dynamic compaction, for full width before placing surface materials.
- c. Stabilize subgrades in accordance with Section 02200 so that loaded construction vehicles do not cause rutting or displacement when depositing materials.

3.3 INSTALLATION

A. General

1. Pavement depths shall be as shown on Drawings or as specified herein.
2. Place bituminous concrete mixture on prepared surface, spread, and strike-off. Spread mixture at minimum temperature of 225°F (107°C). Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness. Protect all adjacent construction from staining with mix or damage by mechanical equipment. Clean, repair, or replace any construction stained or damaged at no additional cost to the Owner.

B. Trench Pavement

1. Place Binder Course and Top Course shall be compacted to the thickness specified on the Trench Details or "Road Restoration Schedule" located on the Design Drawings by steel-wheeled roller.
2. Match roadway edges to and existing driveways or berms as required.

C. Pavement Placement

1. Unless otherwise permitted by the Engineer for particular conditions, only machine methods of placing shall be used, no hand work is allowed. Methods other than machine methods may be used, at no additional cost to the Owner. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to line, grade, width, and crown. The mixtures shall be placed and compacted only at such times as to permit proper inspection and checking by the Engineer.
2. After the paving mixtures have been properly spread, initial and immediate compaction shall be obtained by the use of steel rollers having a weight of not less than 240 pounds per inch width tread. Begin rolling when mixture will bear roller weight without excessive displacement. Compact mixture with hot tampers or vibrating plate compactors in areas inaccessible to rollers. Accomplish breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material. Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
3. Final rolling of the pavement shall be performed by a steel wheel roller weighing not less than 285 pounds per inch width of tread at a mix temperature and time sufficient to allow for final smoothing of the surface and thorough compaction. Continue rolling until roller marks are eliminated and course has attained maximum density.

4. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas, compact asphalt subgrade, and fill with fresh, hot bituminous concrete. Compact by rolling to match surrounding surface density and smoothness.
5. Immediately after placement of new pavement, make joints between existing and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other section of bituminous concrete course. Clean contact surfaces and apply tack coat. All joints between the existing and new pavements shall be keyed on an angle (4' x 10') or as approved by the Owner, and shall be sealed with bitumen RS-1 and sanded.
6. The Contractor shall furnish and install paving to provide transition or aprons for driveways and walkways impacted by new pavement installation.

H. Curb and Gutter Replacement:

1. Replace curb and gutter with same material to pre-construction lines and curb sections. Reset granite curb to pre-construction line and grade.
2. Removal and replacement of curbing shall be done in accordance with Sections 501 and 580, as applicable of the MHD Specifications for Highways and Bridges.
3. Provide expansion joints at each intersection with existing curb sections.
4. Use expansion joints one inch wide. Fill with expansion joint material and cut to shape of curb section.

I. Sidewalk and Driveway Replacement:

1. Gravel sidewalks:
 - a. Gravel sidewalks shall be restored to a condition at least equal to that existing immediately before the work was started.
2. Bituminous concrete sidewalks and driveways:
 - a. Construct in accordance with MHD Section 701, Sidewalks, Wheelchair Ramps and Driveways.
 - b. The subgrade shall be shaped parallel to the proposed surface of the sidewalk or driveway and shall be thoroughly rolled and tamped. All depressions occurring shall be filled with suitable material and again rolled or tamped until the surface is smooth and hard in order for a gravel foundation to be placed upon it.

- c. The sidewalk or driveway shall be a minimum of 3 compacted inches thick, laid in two equal courses.
- d. Sidewalk cross slopes can not exceed 2 percent as required by the Americans with Disabilities Act (ADA). The Contractor shall merge new sidewalk slopes into existing sidewalk slopes as required by ADA.

3. Cement concrete sidewalks, and driveways:

- a. Construct in accordance with MHD Section 701, Sidewalks, Wheelchair Ramps and Driveways.
- b. Use 6x6, W10xW10 welded wire reinforcement.
- c. Concrete sidewalks shall be 4-inches thick and concrete driveways shall be 6-inches thick.
- d. The subgrade for the walk or driveway shall be shaped to a true surface conforming to the proposed slope of the walk, thoroughly rolled at optimum moisture content, and tamped with a power roller weighing not less than one ton and not more than 5 tons. All depressions occurring shall be filled with suitable material and again rolled or tamped until the surface is smooth and hard.
- e. After the subgrade has been prepared, a sub-base of gravel at optimum moisture content shall be placed, thoroughly rolled by a power roller, and tamped. The gravel shall be a minimum of 8 inches in thickness.
- f. The forms shall be smooth, free from warp, strong enough to resist springing out of shape, and deep enough to conform to the thickness of the proposed walk or driveway. All mortar or dirt shall be completely removed from forms that have been previously used. The forms shall be well staked, thoroughly braced, and set to the established lines with their upper edge conforming to the grade of the finished walk or driveway.
- g. The finished surface shall have sufficient pitch from the outside edge to provide for surface drainage. This pitch shall be 1/4 of an inch per foot unless otherwise directed by the Engineer. Before the concrete is placed, the sub-base for sidewalks shall be thoroughly dampened until it is moist throughout but without puddles of water.

4. General:

- a. Valve boxes, manhole frames, and all other castings shall be carefully set to the proposed finished grades.

J. Berms and Waterways

1. Bituminous curbing shall be replaced as required. Curbing shall be machine laid and conform to grade of roadway and adjacent curb areas.
2. Bituminous Cape Cod Berms disturbed shall be replaced in kind. Berms shall be machine laid and conform to grade of roadway and adjacent curb areas. Curbing shall be placed monolithically with the top course.
3. Bituminous waterways which have been disturbed by construction operations shall be repaired or replaced. The waterways shall be repaired and constructed in accordance with the applicable requirements of Section 280 of the MHD Specifications. Waterways shall be placed in two 1-1/2-inch thick courses on a prepared gravel base. Material shall be compacted by tamping or rolling.

3.4 PROTECTION

- A. Protect replacement work with barricades or other devices as approved by Engineer so that no damage occurs as a result of subsequent construction operations.
 1. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 2. Repair damages or other irregularities to satisfaction of Engineer, at no additional cost to the Owner, before final acceptance by the Engineer.

3.5 RAISING BOXES AND CASTINGS

- A. Prior to placing permanent pavement, the Contractor shall raise all castings, gate boxes, utility castings, as required, to proper grade.
- B. Contractor shall coordinate with all utility companies to obtain their requirements on castings.
- C. Castings which need to be raised or adjusted to complete final top course full-width paving shall be done immediately prior to paving.

3.6 CONTRACT CLOSEOUT

- A. Provide in accordance with Section 01700.

END OF SECTION 02576

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SECTION 02901

MISCELLANEOUS WORK AND CLEANUP

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to do the miscellaneous work not specified in other sections but obviously necessary for the proper completion of the work as shown on the Drawings.
- B. When applicable the Contractor shall perform the work in accordance with other sections of this Specification. When no applicable specification exists the Contractor shall perform the work in accordance with the best modern practice and/or as directed by the Engineer.
- C. The work of this Section includes, but is not limited to, the following:
 - 1. Installing and maintaining construction warning signs.
 - 2. Crossing and relocating existing utilities.
 - 3. Restoring of driveways and sidewalks.
 - 4. Cleaning up.
 - 5. Incidental work.
 - 6. Job photographs, if required.
 - 7. Protection and/or removal and reinstallation of existing signs, lampposts, fence posts, fencing and mailboxes.
 - 8. Protection and bracing of utility poles.
 - 9. Restoration and replacement of curbing.
 - 10. Raking and re-seeding of grassed areas disturbed during construction and/or dewatering activities, including silt basin/dewatering activity areas.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Materials required for this Section shall be the same quality of materials that are to be restored. Where possible, the Contractor may re-use existing materials that are removed.

PART 3 – EXECUTION

3.1 INSTALLING AND MAINTAINING CONSTRUCTION WARNING SIGNS

- A. Construction work zone traffic control shall be the contractor's responsibility. Generally, conformance with Part VI of the Manual of Uniform Traffic Control Devices (MUTCD), latest edition, "Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations", will be considered to meet this requirement.

3.2 CROSSING AND RELOCATING EXISTING UTILITIES

- A. This Item includes any extra work required in crossing culverts, water courses, including brooks and drainage ditches, storm drains, gas mains, water mains, electric, telephone, gas and water services and other utilities. This work shall include but is not limited to the following: bracing, hand excavation and backfill (except screened gravel) and any other work required for crossing the utility or obstruction not included for payment in other items of this specification. Notification of Utility Companies shall be required prior to work being done.
- B. In locations where existing utilities cannot be crossed without interfering with the construction of the work as shown on the Drawings, the Contractor shall remove and relocate the utility as directed by the Engineer or cooperate with the Utility Companies concerned if they relocate their own utility.
- C. At pipe crossings and where designated by the Engineer, the Contractor shall furnish and place screened gravel bedding so that the existing utility or pipe is firmly supported for its entire exposed length. The bedding shall extend to the mid-diameter of the pipe crossed.

3.3 RESTORING OF DRIVEWAYS AND SIDEWALKS

- A. Existing public and private driveways disturbed by the construction shall be replaced. Paved drives shall be repaved to the limits and thickness existing prior to construction. Gravel drives shall be replaced and regraded.
- B. Existing public and private sidewalks disturbed by the construction shall be replaced with sidewalks of equal quality and dimension. In general, sidewalks shall be 2-½ inches thick after rolling and compacting and the material shall be top course bituminous asphalt.

3.4 CLEANING UP

- A. The Contractor shall remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall restore the site of the work to a neat and orderly condition. Any materials, and sand or concrete materials shall be cleaned out of the manholes and catch basins. Haybales and siltfence as well as any silt and debris retained by same shall be removed upon approval from the Engineer and Conservation Commission.

3.5 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.

3.6 RESTORATION AND REPLACEMENT OF SIGNS, LAMPPOSTS, FENCE POSTS, FENCING AND MAILBOXES

- A. Existing signs, lamp posts, fence posts, fencing and mailboxes which may be damaged by the Contractor or removed by the Contractor during the course of construction shall be reinstalled in a vertical position at the same location from which they were removed. Damaged items shall be replaced with an item equal to or better than the damaged items. A concrete anchor shall be provided as necessary, at no additional cost, to ensure a rigid alignment. Care shall be exercised in the reinstallation of all items to prevent damage to the new construction.

3.7 PROTECTION AND BRACING OF UTILITY POLES

- A. The Contractor shall be responsible for making all arrangements with the proper utility companies for the bracing and protection of all utility poles that may be damaged or endangered by the Contractors operations. Work under this item shall include the related removal and reinstallation of guy wires, or support poles whether shown on the Drawings or not.

3.8 RAKING AND RE-SEEDING

- A. Grass and landscaped areas disturbed by the Contractor shall be raked and replenished with loam if required. Areas shall be re-seeded as required.

END OF SECTION 02901

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SECTION 02920

TOPSOIL

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this section consists of manufacturing, delivering, and placing 6" of topsoil on prepared subgrade areas disturbed by construction. Topsoil, as available, may be stripped, screened, stockpiled and tested for reuse. Topsoil requirements in excess of available on-site will be imported. Both sources will be placed in compliance with this section.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS and other DIVISION 1 Specification Sections, apply to this section. Related Sections include the following:
 - 1. Section 02200 – Earthwork
 - 2. Section 02945 – Turf

1.3 SUBMITTALS

- A. In accordance with Section-01300. Submit soil analysis report for imported topsoil from the State University Agricultural Extension Service or other approved soil testing laboratory. Report shall cover soil textural classification (percentages of sand, silt, and clay) and include additive recommendations for lawn areas. Field methods of analysis are acceptable, but laboratory report is preferred.

1.4 PRODUCT HANDLING

- A. Do not deliver topsoil in frozen, wet, or muddy condition.

PART 2 - MATERIALS

2.1 IMPORTED TOPSOIL

- A. Friable loam, typical of fertile local topsoil; free-from pure clay, weeds, noxious weed seeds, sod, clods and stones larger than 1 inch, toxic substances, litter, or other deleterious material; having a mildly alkaline to medium acid pH between 6.0 and 7.5. Soluble salts shall not exceed 4 milli-mhos per centimeter.
- B. Soil Texture: 20 to 40% fines (silt and clay fraction passing the 200 sieve) and 60 to 80% Sand and gravel. The maximum particle size shall be 1-inch.

- C. Organic Content: 5 to 10%
- D. Additives: As required by soil analysis of Topsoil for lawn areas.

PART 3 - EXECUTION

3.1 PLACING TOPSOIL

- A. Scarify compacted subgrade to a 2-inch depth to bond topsoil to subsoil. Place topsoil to a minimum depth of 6 inches for outside disturbed areas as shown on the Drawings. Spread evenly and grade to elevations and slopes shown. Hand rake areas inaccessible to machine grading. Use all available on-site stockpiled topsoil and supplement with off-site topsoil as required, including amendments.

END OF SECTION 02920

SECTION 02945

TURF

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all lawn installation and fine grading work and related items as indicated on the Contract Documents and/or as specified in this Section and includes, but is not necessarily limited to, the following:
 - 1. Seeding
 - 2. Maintenance and protection

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS and other DIVISION 1 Specification Sections, apply to this section.
- B. Examine all Contract Documents and all other Sections of the Specifications for requirements therein affecting the work of this trade.
- C. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 02920 – Topsoil

1.3 SUBMITTALS

- A. At least 90 days prior to the first day of the seeding season described in this Section, submit to the Engineer proof of certification of Foreman or Crew Leader as Massachusetts Certified Landscape Professional or Massachusetts Certified Horticulturist in accordance with QUALITY ASSURANCE paragraph of this Section.
- B. Submit proof of landscape contractor's experience to the Engineer in accordance with QUALITY ASSURANCE paragraph of this Section.
- C. At least 30 days prior to intended use, the Contractor shall provide the following samples and submittals for approval in conformance with the requirements of Division 1 Section, SUBMITTALS. Do not order materials until Engineer's approval of samples, certifications or test results has been obtained. Delivered materials shall closely match the approved samples. Acceptance shall not constitute final acceptance. The Engineer reserves the right to reject on or after delivery any material that does

not meet these Specifications.

1. Material Sampling and Testing of Loam Borrow from On-Site or Off-Site Sources shall be specified, performed and paid for under Division 2 Section 2920, TOPSOIL (Outside Disturbed Areas), of this Specification.
 2. Fertilizer:
 - a. Submit product literature of seeding fertilizer and certificates showing composition and analysis.
 - b. Submit the purchasing receipt showing the total quantity purchased for the project prior to installation.
 3. Seed: Submit a manufacturer's Certificate of Compliance to the Specifications with each shipment of each type of seed. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.
 4. Hydroseeding: Prior to the start of hydroseeding, submit a certified statement for approval as to the number of pounds of materials to be used per 100 gallons of water.
 5. Wood Cellulose Fiber Mulch: Submit 4 copies of manufacturer's literature and one material sample.
 6. Limestone: Submit supplier's certification that the limestone being supplied conforms to these Specifications.
 7. All additives needed to amend a specific soil in order to meet these specifications.
- D. Maintenance Instructions: At the time of Acceptance, the Contractor shall submit complete maintenance instructions for turf care for the Owner's use. The instructions shall be reviewed for approval by the Engineer as a pre-condition for Acceptance.

1.4 EXAMINATION OF CONDITIONS

- A. All areas to be improved shall be inspected by the Contractor before starting work and any defects such as incorrect grading, or drainage problems shall be reported to the Engineer prior to beginning this work. The commencement of work by the Contractor shall indicate his acceptance of the areas to be improved, and he shall assume full responsibility for the work of this Division 2 Section, TURF.
- B. The Contractor shall be solely responsible for judging the full extent of work requirements involved.

1.5 QUALITY ASSURANCE

- A. Qualification of Landscape Contractor: The work of this Division 2 Section, TURF, shall be performed by a landscape contracting firm which has successfully installed work of a similar quality, schedule requirement, and construction detailing with a minimum of five years experience. Proof of this experience shall be submitted per SUBMITTALS paragraph of this Division 2 Section, TURF.
- B. Qualification of Foreman or Crew Leader: All work of seeding shall be supervised by a foreman or crew leader who is a certified landscape professional or a certified horticulturist.
 - 1. Landscape professional shall be a Massachusetts Certified Landscape Professional certified by the Associated Landscape Contractors of Massachusetts.
 - 2. Horticulturist shall be a Massachusetts Certified Horticulturist as certified by the Massachusetts Nursery and Landscape Association.
 - 3. Certification shall be current. Proof of certification shall be submitted per SUBMITTALS paragraph of this Division 2 Section, TURF.
- C. The ratio of laborers to certified landscape professionals or certified horticulturist shall not exceed twelve to one. Certified Landscape Professional or Certified Horticulturist shall be on the project site throughout the day to day performance of the work described in this Division 2 Section, TURF.

PART 2 - PRODUCTS

2.1 LOAM

- A. Loam borrow shall be specified, provided, installed and paid for under the work of the Division 2 Section 02920, TOPSOIL, of this Specification.

2.2 SOIL ADDITIVES

- A. Soil additives shall be specified, provided and paid under Division 2 Section 02920, TOPSOIL, except for additional applications of fertilizer that shall be specified, provided and paid for under this Division 2 Section, TURF, based upon recommendations from soil analysis and testing as specified.

2.3 SEED

- A. Seed mixture shall be fresh, clean, new crop seed. Grass shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and properly labeled containers. All seed shall comply with State and Federal seed laws. Submit manufacturer's Certificates of Compliance. Seed that has become wet, moldy or otherwise damaged shall not be acceptable. Tall fescue and rygrass shall contain Acromonium endophytes. Seed containing endophyte must be kept cool

and dry at all times; do not stockpile in the sun.

1. Seed Mixture Composition for disturbed areas:

<u>Common Name</u>	<u>Proportion By Weight</u>	<u>Germination Minimum</u>	<u>Purity Minimum</u>
Tall Fescue (3 varieties minimum)	80%	85%	95%
Kentucky Bluegrass	10%	85%	95%
Perennial Rye	10%	90%	95%

- a. All grass varieties shall be within the top 50 percent of varieties tested in National Turfgrass Evaluation Program, or currently recommended as low maintenance varieties by University of Massachusetts or the University of Rhode Island.
 - b. Seeding rate shall be 6 pounds per 1,000 square feet.
- B. Seed may be mixed by an approved method on the site or may be mixed by a dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers that shall bear the dealer's guaranteed analysis. If seed is mixed by a dealer then the Contractor shall furnish the Engineer the dealer's guaranteed statement of the composition of the mixture.

2.4 JUTE MESH

- A. Jute mesh shall be a uniform, open, plain weave cloth of undyed and unbleached single jute yarn. The yarn shall be of a loosely twisted construction and it shall not vary in thickness more than one-half its normal diameter. Jute mesh shall be furnished in rolled strips and shall meet the following requirements:
1. Width - 48 inches, plus or minus one inch 78 warp - ends per width of cloth (minimum) 41 weft - ends per yard (minimum) Weight shall average 1.22 pounds per linear yard with a tolerance of plus or minus 5%.
- B. Staples shall be U-shaped and shall be approximately six inches long and one inch wide. Machine made staples shall be of No. 11 gauge or heavier steel wire. Handmade staples shall be made from 12-inch lengths of No. 9 gauge or heavier steel wire.
- C. Jute mesh shall be placed within 48 hours after finish grading or topsoiling of an area is completed. If seeding is specified, within 24 hours after seeding of an area is completed. The jute mesh shall be placed in a manner that will minimize disturbance of the underlying soil. All equipment and application processes shall be approved by the ENGINEER prior to use.

- D. The surface shall be smoothed and all gullies and potholes backfilled prior to applying jute mesh. All rocks or clods larger than two inches in size and all sticks and other foreign material that will prevent contact of the jute mesh with the surface shall be removed. If the surface is extremely dry, the Engineer may require watering prior to placement.
- E. Jute mesh shall be placed uniformly, in contact with the underlying soil, at the locations shown on the Drawings or directed by the Engineer. The top edge of each strip shall be anchored by placing a tight fold of mesh vertically in a six inch deep slot or trench in the soil and tamping and stapling in place. Edges of adjacent strips shall be lapped six inches with a row of staples at a maximum interval of three feet in the lapped area. Bottom edges shall be lapped 12 inches over the next lower strip, if applicable, or buried as specified for top edges.
- F. Check slots shall consist of separate four foot strips of jute mesh placed at right angles to the direction of water flow immediately prior to placing the general covering of jute mesh. Check slots shall be anchored by burying the top edge of the strip as described above.
- G. Check slots shall be spaced so that one check slot, or junction slot of the jute mesh occurs every 75 feet on gradients of less than 4% and every 50 feet on gradients of more than four percent. On slope drains, a check slot or an end slot shall occur every 25 feet unless otherwise specified.
- H. Edges of jute mesh shall be buried around the edges of catch basins and other structures.
- I. Jute mesh shall be held in place by wire staples driven vertically into the soil. The mesh shall be fastened at intervals not more than three feet apart in three rows for each strip of mesh, with one row along each edge and one row alternately spaced in the middle. All ends of the mesh and check slots shall be fastened at six inch intervals across their width.
- J. The Contractor shall maintain the areas covered by jute mesh until final acceptance of the project. Prior to final acceptance, any damaged areas shall be reshaped as necessary, reseeded, if applicable; and the jute mesh satisfactorily repaired or replaced.

2.5 FERTILIZERS

- A. Fertilizer shall be a commercial product complying with the State and United States fertilizer laws. Deliver to the site in the original unopened containers that shall bear the manufacturer's certificate of compliance covering analysis. Fertilizer shall contain not less than the percentages of weight of ingredients as recommended by the soil analysis specified, performed and paid for under the Division 2 Section, TOPSOIL, of this Specification.

2.6 LIMESTONE

- A. Ground limestone for adjustment of loam borrow pH shall contain not less than 85 percent of total carbonates and shall be ground to such fineness that 40 percent will pass through 100 mesh sieve and 95 percent will pass through a 20 mesh sieve. The Contractor shall be aware of loam borrow pH and the amount of lime needed to adjust pH to specification in accordance with testing lab recommendations.

2.7 WOOD CELLULOSE FIBER MULCH

- A. Mulch to cover hydroseeded areas with slopes less than 3 to 1 shall be fiber processed from whole wood chips and clean recycled newsprint in a 1:1 proportion manufactured specifically for standard hydraulic mulching equipment. Fiber shall not be produced from recycled material such as sawdust, paper, or cardboard.
- B. Moisture content shall not exceed 10 percent, plus or minus 3 percent as defined by the pulp and paper industry standards. Fiber shall have a water holding capacity of not less than 900 grams water per 100 grams fiber.
- C. The mulch shall be of such character that the fiber will be dispersed into a uniform slurry when mixed with water. It shall be nontoxic to plant life or animal life.
- D. The mulch shall contain a non-petroleum based organic tackifier and a green dye to allow for easy visual metering during application but shall be non-injurious to plant growth.

2.8 HERBICIDES, CHEMICALS AND INSECTICIDES

- A. Provide chemicals and insecticides as needed for fungus or pest control. All chemicals and insecticides shall be approved by the Massachusetts Department of Food and Agriculture for the intended uses and application rates.
- B. Provide post-emergent crab grass control throughout the maintenance period to ensure a germinated and mown lawn free of crab grass.

2.9 WATER

- A. The Contractor may use water provided by the Town upon request and approval of the DPW, if available. The Contractor shall be responsible to furnish his own supply of water to the site at no additional cost to the Owner. If Town water is not available, the Contractor shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of water or use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation. The Contractor's use of Town water shall be at his own risk.

PART 3 - EXECUTION

3.1 FILLING AND COMPACTION

- A. Filling and compaction of loam shall be specified, performed and paid for under the work of the Division 2 Section, TOPSOIL, of this Specification.

3.2 FINE GRADING

- A. Fine grading shall be specified, performed and paid for under the work of the Division 2 Sections, Earthwork, Rough Grading and Topsoil, of this Specification.

3.3 SEEDING

- A. Contractor shall obtain Engineer's written approval of fine grading and bed preparation before doing any seeding.
- B. Limit of proposed grading shall be limit of seeding unless otherwise indicated on the Contract Documents. All lawn areas disturbed outside the limit of seeding shall be prepared and seeded as specified herein at no additional cost.
- C. The season for seeding shall be from April 1 to May 31 and from August 15 to September 30. The actual planting of seed shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and by accepted practice in this locality. To prevent loss of soil via water and wind erosion and to prevent the flow of sediment, fertilizer, and pesticides onto roadways, sidewalks, and into catch basins, seed loam areas within 5 Days of spreading the loam.
- D. Seed only when the bed is in a friable condition, not muddy or hard.
- E. Seeding of Disturbed areas shall be by Hydroseeding Method specified as follows:
 - 1. Prior to the start of work, furnish a certified statement as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of hydroseeding that can be covered with the quantity of solution in the hydroseeder.
 - 2. Hydroseed with wood cellulose fiber mulch at a rate as designated above in Part 2 – PRODUCTS.
 - 3. For the hydroseeding process, a mobile tank with a capacity of at least 500 gallons shall be filled with water and the mixture noted above in the specified proportions. The resulting slurry shall be thoroughly mixed by means of positive agitation in the tank. Apply the slurry by a centrifugal pump using the hose application techniques from the mobile tank. Only hose application shall be permitted. At no time shall the mobile tank or tank truck be allowed onto the prepared hydroseed beds. The hose shall be equipped with a nozzle of a proper design to ensure even distribution of the hydroseeding slurry over

the area to be hydroseeded and shall be operated by a person thoroughly familiar with this type of seeding operation.

4. Contractor shall obtain Engineer's written approval of fine grading and bed preparation before doing any hydroseeding.
5. Limit of work shall be limit of hydroseeding unless otherwise indicated on the Contract Documents. All lawn areas disturbed outside the limit of hydroseeding shall be hydroseeded.
6. Seed only when the bed is in a friable condition, not muddy or hard. Construction methods shall conform to hydraulic method requirements specified in the Standard Specification.
7. Hydroseeding shall be a two-step process.
 - a. Step one shall consist of spreading 100 percent of the required seed uniformly over the prepared loam bed so that the seed comes into direct contact with the soil. To mark the progress of the hydroseeding operation the Contractor may add 10 percent of the wood cellulose fiber mulch to the slurry.
 - b. Step two shall consist of a separate application of wood cellulose fiber mulch immediately following the first step of hydroseeding noted above. Apply the wood cellulose fiber mulch at a rate of 2,000 pounds per acre.

3.4 TURF MAINTENANCE

- A. Maintenance shall begin immediately after any area is seeded or sodded and shall continue for a 60 day active growing period for seeded areas or until Final Acceptance, whichever is longer following the completion of all lawn construction work, and until final acceptance of the project. In the event that seeding operations are completed too late in the Fall for adequate germination and growth of grass, then maintenance shall continue into the following Spring for the minimum 60 Day period and including the One (1) Year Maintenance Period.
- B. Maintenance shall include re-seeding, two (2) mowings, watering, weeding, fertilizing a minimum of two times in addition to the fertilizer incorporated by harrowing into the spread loam, and resetting and straightening of protective barriers. Lawn work maintenance shall also include chemical treatments as required for fungus and/or pest control.
- C. During the maintenance period, any decline in the condition of turf areas shall require immediate action to identify potential problems and to undertake corrective measures.
- D. Watering shall be done in a manner that will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment.

1. The Contractor shall provide all labor and arrange for all watering necessary to establish an acceptable lawn. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary to maintain moist soil to a depth of at least two (2) inches for seeded areas and four (4) inches for sodded areas. At no time shall a tank truck be allowed on the reseeded/re-sodded beds.
 2. Watering shall be done in a manner that will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment. The Contractor shall furnish sufficient watering equipment to apply water to the required soil depths each 8-hour period.
- E. After the grass in seeded areas has germinated, reseed all areas and parts of areas that fail to show a uniform stand of grass. Reseed such areas and parts of areas repeatedly until all areas are covered with a satisfactory growth of grass with no less than 20 grass shoots per square inch and 2880 grass shoots per square foot. Reseeding together with necessary grading, fertilizing, and trimming shall be done at the Contractor's expense.
- F. Mowing and Edging:
1. The Contractor shall keep lawn areas mowed until Acceptance of the contract by cutting to a height of two (2) inches when growth reaches three (3) inches or as directed by the Engineer.
 2. At each mowing, all edges of walks, drives, plant beds and other border conditions shall be edge trimmed by hand or machine to produce straight and uniform edge conditions.
 3. Remove and discard from paved areas only clippings and debris generated by each mowing and edging operation legally off-site. Engineer, if practical and aesthetic, may allow sweeping (not blowing) clippings back into grass. Mowers shall be equipped with mulching blades. Do not remove from grass areas any clippings that have been generated by mowing operations. Do not mow grass when wet.
- G. Fertilizing for seeded lawns: The first application of fertilizer is specified, provided, performed and paid for under the Division 2 Section, TOPSOIL. A second application of fertilizer shall be applied to seeded areas at the time of the first mowing and shall be performed and paid for under this Division 2 Section, TURF. This second application shall be applied at a rate that ensures that one-half pound of nitrogen is applied per 1,000 square feet. Phosphorus and potassium shall be applied proportionally in accordance with the recommendations of the soil tests and the quantities previously integrated into the soil during the first application. A third application of nitrogen fertilizer shall be applied to seeded areas approximately two months after the second application and shall be paid for under this Division 2 Section, TURF. This third application shall correspond to the following application rates dependent upon the month of application.

1. May 1-15: Apply 1.0 pound of nitrogen per 1,000 square feet.
2. June 15-30: Apply 1.0 pound of nitrogen per 1,000 square feet.
3. August 15 through September 15: Apply 1.0 pound of nitrogen per 1,000 square feet.
4. November 1-15: Apply 1.5 pounds of nitrogen per 1,000 square feet.

**Nitrogen fertilizer shall be composed of 50 percent slowly soluble or slow release nitrogen fertilizer.

3.5 APPLYING LIMESTONE

- A. The Contractor shall return to the site at the beginning of the next seeding season as specified above and spread limestone across all lawn areas installed under this Contract. The work of liming the fields shall be as specified under Division 2 Section, TOPSOIL, of this Specification, and performed and paid for under this Division 2 Section, TURF. Limestone shall be spread at rates determined by the soil tests specified.

3.6 ACCEPTANCE

- A. Following the minimum required maintenance periods for lawn construction, the Contractor shall request the Engineer in writing for a formal inspection of the completed work. Request for inspection shall be received by the Engineer at least 10 Days before anticipated date of inspection.
- B. Acceptance Requirements:
 1. At the end of the maintenance period, seeded areas shall have a close stand of grass as defined above with no weeds present and no bare spots greater than 3 inches in diameter over greater than 5 percent of the overall seeded area. At least 90 percent of the grass established shall be permanent grass species. If seeded areas are deficient, the Contractor's responsibility for maintenance of all seeded areas shall be extended until deficiencies are corrected. Seeded areas to be corrected shall be prepared and reseeded in accordance with the requirements of this Division 2 Section, TURF.
- C. Furnish full and complete written instructions for maintenance of the lawns to the Owner at the time of acceptance in conformance with Submittals requirements.
- D. Engineer's inspection shall determine whether maintenance shall continue in any part.

3.7 CLEAN UP

- A. Absolutely no debris may be left on the site. Excavated material shall be removed as directed. Repair any damage to site or structures to restore them to their original

condition, as directed by the Engineer, at no cost to the Owner.

END OF SECTION 02945

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SECTION 02950

PLANTING

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Contract Documents and as specified in this Section and includes, but is not limited to, the following:
 - 1. Planting wetland plants and seed mixes listed in the Wetland Restoration Plan and plant schedule.
 - 2. Staking, guying, and anchoring trees.
 - 3. Planting maintenance.
 - 4. One year warranty period for all plants.
 - 5. Providing and placing wetland soils.
- B. The Contractor shall maximize the reuse of on-site excavated surficial soils (0-12") with the exception of soils where invasive common reed is located and specified for removal and off-site disposal.

1.2 RELATED DOCUMENTS

- A. The General Documents, as listed on the Table of Contents, and applicable parts of Division 1, GENERAL REQUIREMENTS, shall be included in and made a part of this Section.
- B. Examine all Contract Documents and all other Sections of the Specifications for requirements therein affecting the work of this trade.
- C. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 01110 – Environmental Protection
 - 2. Section 02020 – Erosion and Sediment Control
 - 3. Section 02200 – Earthwork
 - 4. Section 02920 – Topsoil

5. Appendix E – Wetland Delineation Report

1.3 REFERENCES

A. The following standards shall apply to the work of this Section.

1. Hortus III, 1976, L. H. Bailey Hortorium.
2. Tree and Shrub Transplanting Manual, E.B. Himelick, 1991, International Society of Arboriculture.
3. American National Standards Institute (ANSI):

Z60.1 American Standard for Nursery Stock, latest edition, published by American Nursery & Landscape Association, (ANLA).

1.4 SUBMITTALS

- A. At least 90 days prior to the first day of the planting season described in this Division 2 Section, PLANTING, submit to the Engineer proof of certification of Foreman or Crew Leader as Massachusetts Certified Landscape Professional or Massachusetts Certified Horticulturist in accordance with QUALITY ASSURANCE paragraph of this Section.
- B. Submit proof of landscape contractor's experience with similar coastal wetland restoration projects, at least five in the past three years, to the Engineer in accordance with QUALITY ASSURANCE paragraph of this Division 2 Section, PLANTING.
- C. At least 30 days prior to ordering materials, the Contractor shall submit to the Engineer representative samples, certifications, manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Engineer. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Engineer reserves the right to reject, on or after delivery, any material which does not meet these Specifications.
- D. Material Sampling and Testing:
 1. Material Sampling and Testing of Wetland Soils from off-site sources shall be specified, performed, and paid for under the work of this Section. Testing of the off-site wetland soils shall occur in-place after the soils have been spread and represents a second testing of the off-site wetland soils. The first sampling and testing shall have occurred prior to delivery of the wetland soils as specified, performed and paid for under the work of this Section. Additional sampling and testing of delivered and stockpiled wetland soils or delivered and spread wetland soils to verify that it meets the test results submitted for approval under the this Section.

2. Material Sampling and Testing of Off-Site Loam: Off-site loam shall be sampled and tested as specified, performed and paid for under the Division 2 Section, TOPSOIL, of this Specification.
3. Planting Mulch: Submit manufacturer's certification of contents.
4. Antidesiccant: Submit manufacturer's product data.
5. Peat: Submit manufacturer's certification of contents.
6. Mycorrhizal Fungal Inoculant:
 - a. Submit manufacturer's product data certifying that inoculant being supplied conforms to these Specifications.
 - b. Submit the purchasing receipt showing the total quantity purchased for the Project prior to installation.
 - c. Submit empty packets of fungal spore inoculant to the Engineer for verification of use.
7. Tree Staking System: Submit manufacturer's product data of system.
8. Soil Additives: Submit manufacturer's product data for all soil additives needed to amend a specific soil in order to meet the requirements of this Division 2 Section, PLANTING.

1.5 EXAMINATION OF CONDITIONS

- A. All areas to be planted shall be inspected by the Contractor before starting work and any defects such as incorrect grading or inadequate drainage shall be reported to the Engineer prior to beginning this work.
- B. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to the potential need for storing and maintaining plants temporarily and/or re-handling plants prior to final installation.
- C. All plants are the full responsibility of the Contractor between the time of digging at the nursery and final acceptance.

1.6 QUALITY ASSURANCE

- A. Qualification of Landscape Contractor: The work of this Division 2 Section, PLANTING, shall be performed by a landscape contracting firm which has successfully installed work of a similar quality, schedule requirement, and construction detailing with a minimum of five years experience with specific experience in coastal wetland restoration. Proof of this experience shall be submitted per SUBMITTALS paragraph of this Division 2 Section, PLANTING.
- B. Qualification of Foreman or Crew Leader: All work of unloading, stockpiling, storing, transporting on-site, planting, staking and guying, fertilizing, and

maintenance of trees, shrubs, vines, groundcover, and perennials shall be supervised by a foreman or crew leader who is a certified landscape professional or a certified horticulturist.

1. Landscape professional shall be a Massachusetts Certified Landscape Professional certified by the Associated Landscape Contractors of Massachusetts.
 2. Certification shall be current. Proof of certification shall be submitted per SUBMITTALS paragraph of this Division 2 Section, PLANTING.
- C. The ratio of laborers to certified landscape professionals or certified horticulturist shall not exceed twelve to one. Certified Landscape Professional or Certified Horticulturist shall be on the project site throughout the day to day performance of the work described in this Division 2 Section, PLANTING.

PART 2 - PRODUCTS

2.1 WETLAND SOILS

- A. Friable loam, typical of organic wetland soils; free from pure clay, weeds, noxious weed seeds, sod, clods and stones larger than 1 inch, toxic substances, litter, or other deleterious substances; having a mildly alkaline to medium acid pH between 6.5 and 7.5. Soluble salts shall not exceed 4 milli-mhos per centimeter.
- B. Soil texture: 30 to 50% fines (silt and clay fraction passing the 200 sieve) and 50 to 70 percent sand meeting the USDA textural classifications of sandy loam, fine sandy loam, silt loam, or loam. The maximum particle size shall be 1 inch.
- C. Organic Content shall be 10-20%, Cation Exchange Capacity shall be at least 20, and a bulk density between 1,600 lbs/cy and 1,800 lbs/cy.

2.2 LOAM BORROW

- A. Loam borrow for planting shall be specified and provided under the work of the Division 2 Section, TOPSOIL, of this Specification.

2.3 SOIL ADDITIVES

- A. Soil additives shall be specified and provided for under Sections 02920 and 02945.

2.4 GRADES AND STANDARDS OF PLANTS

- A. The Contractor shall furnish all plants shown on the Contract Drawings, as specified, and in quantities listed on the PLANT SCHEDULE. No substitutions will be permitted, without written approval by the Engineer. All plants shall be nursery

grown unless specifically authorized to be collected as noted on the PLANT SCHEDULE.

- B. All plants shall be typical of their species or variety and shall have a normal habit of growth and be legibly tagged with the proper name. Only plant stock grown within Hardiness Zones 1 through 6b, as established by the USDA Plant Hardiness Zone Map, latest edition, will be accepted.
- C. Plants shall be in accordance with ASNS Standards of the American Nursery & Landscape Association except as noted in this Division 2 Section, PLANTING. Botanical plant names shall be in accordance with plant designations included in Hortus III.
- D. If, at any time during the performance of the Contract, any plant shows signs of graft incompatibility, as determined by the Engineer, then the tree or shrub and all other similarly grafted plants of the same Genus/Species/Variety shall be rejected and removed from the site. Visual symptoms of graft incompatibility as cause for rejection include:
 - 1. Development of over-growths by rootstock or scion resulting in the development of shoulders or inverted shoulders.
 - 2. Suckering of the rootstock combined with poor growth or dieback of scion.
 - 3. Any mechanical weakness between scion and rootstock.
 - 4. Any marked difference in bark pattern and structure between scion and rootstock.
- E. All shrubs shall meet the following standards:
 - 1. All shrubs shall be healthy and vigorous plants which are very well shaped, heavily branched, densely foliated, and true to form for the variety.
 - 2. Canes or Trunk(s) and Branches:
 - a. Well formed and sturdy.
 - b. Branching shall be uniformly distributed close to the ground.
 - c. Scars shall be free of rot and not exceed 1/4 the diameter of the wood beneath in greatest dimension unless completely healed (except pruning scars).
 - d. Pruning scars shall be clean cut and shall leave little or no protrusion from the trunk or branch.
 - e. Graft unions shall be completely healed.
 - f. No suckers or water sprouts.
 - g. Contain no dead wood.
 - h. Free of cracks, splits, or cambium peeling.
 - 3. No shrub with pest or mechanical damage will be accepted.

4. Shrubs shall show no signs of frost or winter damage to the foliage. Foliage shall not be in a state of drought stress. Leaves or needles shall show no signs of wilt or desiccation due to weather stress at any season of the year.

F. The planting schedule follows this Section.

2.4 ROOT SYSTEMS FOR ALL PLANTS

- A. Each plant shall have an extensive, symmetrically balanced fibrous root system. Any root ball which shows signs of asymmetry, girdling, injury, or damage to the root system shall be rejected.
- B. Curling or spiraling of the roots along the walls of rigid containers will not be accepted. Curling, spiraling or girdling roots within balled and burlapped material will not be accepted.
- C. All parts of the fibrous root system of all plants shall be moist and fresh with a white color when washed of soil. When the plant is removed from the container, the visible root mass shall be healthy with white root tips. The root systems of all plants shall be free of disease, insect pests, eggs, or larvae.
- D. All trees, and all shrubs which are not grown in containers must be moved with the root systems as solid units with balls of earth firmly wrapped with untreated 8 ounce natural, biodegradable fabric burlap, firmly laced with stout, natural biodegradable cord or twine. The base of the tree trunks shall be wrapped with a protective burlap layer, surrounded by a cardboard trunk protector, and loosely tied with twine.
- E. The diameter and depth of the balls of earth must encompass the fibrous and root feeding system necessary for the healthy recovery of the plant. Minimum root ball diameters and depths shall be in accordance with ASNS standards.
- F. No plants shall be loose in the container.
- G. Container grown plants which have roots growing out of the container will be rejected.

2.5 PLANTING SOIL MIX

- A. Planting soil mix shall be an approved wetland soils specified and provided for under this Section and that has been pH adjusted according to particular planting applications and improved through the addition of organic matter as directed below. Wetland soils shall conform to the following pH levels:
 1. Planting soil mix for general planting of non-acid loving plants shall have a true pH value of 6.0 to 6.5. Planting soil mix shall be amended by the Contractor at his own expense to the proper pH range by mixing with dolomitic limestone as specified under the Division 2 Section, TOPSOIL, of this Specification.

2. The amount of either sulfur or limestone required to adjust the planting soil mix to the proper pH range shall be approved by the Engineer on the basis of soil tests as specified, under the Division 2 Section, TOPSOIL, of this Specification.

2.6 WATER

- A. The Contractor shall be responsible to furnish his own supply of water to the site at no extra cost. If possible, the Owner shall furnish the Contractor upon request with an adequate source and supply of water at no charge. However, if the Owner's water supply is not available or not functioning, the Contractor shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

2.7 ANTIDESICCANTS

- A. Antidesiccants shall be emulsions or other materials which will provide a protective film over plant surfaces permeable enough to permit transpiration and specifically manufactured for that purpose. Manufacturer of antidesiccant shall be subject to the Engineer's approval and shall be used only after approval by the Engineer. Antidesiccant shall be delivered in containers of the manufacturer and shall be mixed and applied according to the manufacturer's instructions.

2.8 SEED MIXES

- A. The seed mix for those areas located above the high tide line (el. 14.88) shall be New England Salt Tolerant Grass Seed Mix supplied by New England Wetland Plants or approved equal.
- B. Seed mix shall consist of the following:

<u>Botanical Name</u>	<u>Common Name</u>	<u>Indicator</u>
<i>Elymus canadensis</i>	Canada Wild Rye	FACU+
<i>Festuca rubra</i>	Creeping Red Fescue	FACU
<i>Sorghastrum nutans</i>	Indian Grass	UPL
<i>Andropogon gerardii</i>	Big Bluestem	FAC
<i>Bouteloua curtipendula</i>	Side Oats Grama	NI
<i>Panicum virgatum</i>	Switch Grass	FAC
<i>Schizachyrium scoparium</i>	Little Bluestem	FACU
<i>Sporobolus cryptandrus</i>	Sand Dropseed	UPL

PART 3 - EXECUTION

3.1 PLANTING

- A. Furnishing and planting of plant material shall include, but shall not be limited to, the digging of planting pits and plant beds, amendment of wetland soils or loam as required to produce planting soil mix, provision of soil additives required to adjust for pH requirements of specific plants, furnishing the plants as specified as well as the labor of planting, fertilizing, and maintenance.
- B. Prior to spreading of wetland soils, subgrades shall have been tested to determine if they are too compact to drain water as specified, performed and paid for under the work of this Section.
- C. The Contractor shall locate plant material sources and ensure that plants are shipped in timely fashion for installation.
- D. Contractor shall locate all existing underground utilities that are within 10 feet of the proposed planting pits and notify the Engineer of any conflicts prior to digging plant pits.
- E. Seasons for Planting:
 - 1. Spring: Deciduous materials - March 21 through May 1; Evergreen materials - April 15 through June 1.
 - 2. Fall: Deciduous materials – October 1 through December 1: Evergreen materials – August 15 through October 15.
 - 3. No planting or seeding shall be completed in frozen soils.
- F. Plant Material Inspection:
 - 1. At least one month prior to the expected planting date, the Landscape Contractor shall select and tag stock to be planted under this Division 2 Section, PLANTING.
 - 2. The Contractor shall be responsible to certify the availability of quality plants in specified sizes from his/her sources of supply.
 - 3. Unless specifically designated otherwise, a representative of the Engineer may elect to accompany the Contractor on all plant material selection field trips.
 - 4. Representative samples of trees, shrubs, and ground cover plants may be tagged or marked for approval as an "Approved Typical Sample" and shipped to the site. Any shrub or groundcover plant that arrives at the construction site that does not meet the Approved Typical Sample will be rejected by the Engineer.
 - 5. Plants to be inspected shall be in locations and conditions that allow direct and un-obscured inspection by the Engineer. Container grown or balled and burlapped shrubs shall be pulled from holding blocks by the nurseryman for

scrutiny by the Engineer at no additional cost to the Owner. Harvested trees held in storage shall not have branches tied up. Harvested trees shall not have trunks obscured by burlap, cardboard trunk protection, or other devices that would otherwise obscure inspection. In the event that branches are tied up, trunks are obscured by burlap or cardboard trunk protection, or root flares hidden by burlap and twine and the Engineer cannot inspect root flares, trunks or branching habit, the Contractor shall bear all responsibility and costs associated with tree rejection at a later date during the course of the Contract.

6. Inspection and approval of plants at the source shall not impair the right of subsequent inspection and rejection upon delivery to the site, or during the progress of the work if the Engineer finds that plants do not meet the requirements of the PLANT SCHEDULE or this Contract, have declined noticeably due to handling abuse, lack of maintenance, or other causes. Cost of replacements, as required, shall be borne by the Contractor.

G. Placement of Wetland Soils for planting soil shall be specified under the work of this Section. Obtain Engineer's written approval of work of rough grading and finish grading prior to starting the work of planting.

H. Planting:

1. Notify the Engineer three (3) working days prior to the proposed arrival of plant material on the site. If not planted within 24 hours of delivery to the site, all plants shall be maintained in an on-site nursery. Container grown shrubs stored on site shall be shaded from direct sunlight at all times and shall not be stored directly on paved surfaces. All plants delivered to the site and not planted within 24 hours of delivery shall have their root balls covered with mulch and shall be watered on a daily basis such that root balls are kept moist throughout.
2. Locations for all plants and outlines for planting areas shall be staked on the ground by the Contractor for approval by the Engineer before any plant pits or plant beds are dug. Notify the Engineer no less than 3 days prior to desired inspection date of staking to schedule site visit.
3. Surficial salt marsh soils (to depth below high marsh root mass) shall be removed and staged immediately adjacent to the site for no more than five days. Soils shall be kept moist and replaced in-situ after installation of the sewer structures and/or pipe.
4. Surficial soils (0-12" deep) from wetland resource areas (e.g. coastal beach, bordering vegetated wetland) other than those identified as salt marsh shall be removed and staged within the construction limits of work. Soils shall be replaced in-situ in areas of similar ecotype as from where they were removed. Surficial soils (0-12" deep) shall be removed from areas identified with invasive common reed vegetation and disposed of off-site. Care shall be taken to avoid dispersal of soils from invasive vegetation within limits of work.

5. Circular plant pits shall not be required provided that the minimum dimension between the edge of the pit and the face of the rootball is not less than required by this Division 2 Section, PLANTING.
6. All plant pits dug with a machine shall have the sides of the holes scraped with hand shovels to prevent glazing or compaction of the sides of the hole. Remove and stockpile excavated surficial soils (0-12" deep) for reuse as backfill for plant pit. All subsoil excavated from the bottoms of planting pits shall be removed from the site.
7. Plant pits shall be dug to the dimensions shown on the Contract Documents.
 - a. Individual plant pits for shrubs shall be three times greater in diameter than the diameter of the root ball. Place root ball directly on subgrade. Slope sides of tree pits at a 45 degree angle.
 - b. Plant beds for shrub massing shall be one large and continuous excavated bed. Extend bed no less than 3 feet beyond limits of shrub root balls on perimeter of bed.
 - c. Plant pits for trees and shrubs shall be dug to the depth of the rootball to be planted.
 - d. Remove all soil from around the root flare of the stem of the plant and from the top of the rootball to determine the true depth of the rootball. All plants that have been planted and have root flares that are buried will be rejected.
8. All plant roots and earth balls must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation, and at the site until the final planting.
9. Remove container plants from containers prior to planting.
10. Shrubs shall be placed in the center of plant pits, plumb, with the crown of their roots exposed and located above the surrounding finish grade.
11. Prior to completion of planting installations, remove rope and cut wire baskets from the top 1/3 of the root balls. Pull burlap away from the trunk or stem of the plant and cut burlap from the top 1/3 of the root balls.
12. Planting shall be backfilled with approved planting soil to the full depth of the planting pit or bed. Eliminate air pockets and compact the soil by flooding the tree pit or plant bed within 2 hours of planting installation. After water has drained from the planting pit or bed and planting backfill has dried enough additional planting soil shall be spread in pit or bed to bring the finished surface of the planting pit or bed to grades shown on the Contract Documents. A saucer shall be formed around each plant at a depth of 3 inches for trees and for shrubs.
13. Fertilizer shall be spread over the plant saucer or plant bed between the saucer and the edge of the rootball. Till the fertilizer into the soil to a depth of four

inches prior to the placement of the planting mulch. Fertilizer shall be provided for under the Division 2 Section, TOPSOIL, of this Specification. Do not mulch until placement of the fertilizer has been verified by the Engineer. Fertilizer application rates shall be as determined by soil testing, analysis, and testing laboratory recommendations specified.

14. Planting densities shall be as shown in the Wetland Restoration Plan drawings included in Appendix E for the identified Coastal Salt Marsh, Bordering Vegetated Wetland, Coastal Beach, and Upland areas. Refer to the Planting Schedule for quantities. Locations of plantings in Coastal Salt Marsh, Bordering Vegetated Wetland, and Upland areas shall be coordinated with the Engineer and Owner prior to installation. Coastal Beach area plantings shall be installed at 1 foot offsets. No plantings shall be installed in the area identified as Coastal Beach 3 in the Wetland Replication Plan.
- I. All plants shall be watered immediately following planting as necessary to thoroughly moisten rootball and plant pit loam and thereafter shall be inspected frequently for watering needs and watered, as required, to provide adequate moisture in the planting pit. The Contractor shall inspect tree pits 24 hours after initial watering to confirm that they are draining properly. If surface water or excessively saturated plant pit soils exist, the Contractor shall immediately notify the Engineer. The Engineer will recommend remedial measures based upon site conditions.
- J. Mulch material shall be placed over entire saucer areas of individual trees and shrubs and over the entire area of planting beds to a depth of 3 inches after settlement, not later than one week after planting. Do not apply mulch prior to the first watering of plant materials. Do not apply mulch prior to placement of surface applied fertilizer and verification of placement by the Engineer.
- K. Pruning:
 1. As directed by the Engineer, each plant shall be pruned in accordance with the workmanship requirements of "Pruning Standards" for Class I, fine pruning, to preserve the natural character of the plant.
 2. Tree pruning, as required, shall be undertaken to the full height of affected trees.
 3. All dead wood or suckers and all broken or badly bruised branches shall be removed. Never cut a leader.
- L. Antidesiccant shall be applied to all evergreen and broadleaf evergreen plants in December and again in February, according to manufacturer's application recommendations and as directed by the Landscape Architect.
- M. Protect existing lawns from damage. Any damage resulting from planting operations shall be repaired immediately at no cost to the Owner. Repair work shall be as specified and installed under the work of Division 2 Section, TURF, of this

Specification and paid for under the work of Division 2 Section, MISCELLANEOUS WORK AND CLEANUP.

- N. In the event that rock or underground construction work or obstructions are encountered in any plant pit or bed excavation work, alternate locations will be coordinated with the Engineer. Relocation of plant pits or beds shall be provided at no additional cost to the Owner. Provide the Engineer with no less than 48 hours notice of obstruction so that a site visit can be scheduled to establish new locations for plants.
- O. Absolutely no debris may be left on the site. Repair any damage to site as directed by the Engineer, at no additional cost.
- P. Seed mix shall be applied to clean bare soil. Seed can be applied by hydro-seeding, mechanical spreader or for small areas (less than 100 square feet) by hand. Lightly rake or roll to ensure proper seed to soil contact. Seeded areas shall be lightly mulched with weed free straw to conserve moisture.

3.2 MAINTENANCE

- A. Maintenance shall begin immediately after each plant is planted and shall continue for a minimum 30-day Monitoring Period and until the end of the fall planting season following Final Acceptance.
- B. Maintenance shall consist of keeping the plants in a healthy growing condition and shall include but is not limited to watering, weeding, cultivating, pruning, re-mulching, straightening of trees to a plumb position, removal of dead material, resetting plants to proper grades or upright position, and maintaining the planting saucer.
 - 1. Plants shall be inspected for watering needs at least twice each week and watered to promote plant growth and vitality. The following watering rates assume that the soil is free draining. If the on-site conditions do not ensure a free draining soil, then notify the Engineer in writing of this condition. Watering rates for trees, shrubs, ground cover, vines and perennials in free draining soils are presented here as guidelines to ensure that the top six inches of plant bed soil remains moist at all times. Actual watering rates may vary depending upon soil conditions. Guideline rates shall be as follows:

<u>Type of Plant/Size</u>	<u>Weekly Watering Rate</u>
Shrubs	
Up to 2 ft. height	10 gallons
2 - 4 ft. height	20 gallons
4 - 6 ft. height	30 gallons
6 - 8 ft. height	40 gallons

- a. Water shall be applied by 1 inch diameter hose with an attached metering gauge.

2. For trees in mulched beds, apply water to the ground surface directly under the canopy. Water shall be applied at a sufficiently slow rate to prevent run off from the soil surface but great enough to equal 0.2 inches of water per square foot of canopy area per hour for 5 hours per week.
 3. Planting beds and individual plant pits shall be kept free of weeds, and mulch shall be replaced as required to maintain the specified layer of mulch. Beds and individual pits shall be neat in appearance and maintained to the designed layout.
 4. Plants that die during the maintenance period shall be removed and replaced by the Contractor within one week of notification and replaced during that growing season, unless directed otherwise by the Engineer.
 5. Work of pruning, fertilizing, spraying, and similar activities shall be undertaken only by Certified Arborists and licensed chemical applicators, as pertinent to the work being performed.
- C. During the maintenance period, any decline in the condition of plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturalists to inspect plant materials and to identify problems and recommend corrective procedures. The Engineer shall be immediately advised of such actions. Inspection and recommendation reports shall be submitted to the Engineer.

3.3 ACCEPTANCE

- A. Upon completion of all planting work, the Contractor shall request in writing that the Engineer formally inspect the planting work.
- B. If plant materials and workmanship are acceptable, the Engineer will issue a written Certificate of Conditional Acceptance to the Contractor.
- C. Following the issuance of the Certificate of Conditional Acceptance to the Contractor, the Contractor shall maintain the plants for a minimum 30 day Monitoring Period. At the end of the Monitoring Period, the plant material will be inspected by the Engineer to determine whether or not all planting work has been performed to the requirements of this Division 2 Section, PLANTING.
- D. Acceptance Standards at end of the Monitoring Period: If plant material is reviewed when it is in full leaf, leaves shall be plump with water with a shape indicative of the species and shall be free of insect, pest and disease damage. Twigs shall have living cambium for their full length. Twigs and branches shall have a full bud set for their full length, including terminal buds. Trunks and branches shall be free of frost cracks; sun scald; damage due to insects, pests, and disease; structural defects; and damage resulting from machinery or tools. Plant material inspected and reviewed when the plants are not in full leaf shall have twigs, branches and trunks meeting the above

requirements. All plants regardless of the season of review shall have a minimum of 75 percent healthy, balanced branching structure with a healthy terminal leader(s) with viable terminal bud(s).

- E. If any number of plants do not meet these Acceptance Standards at the time of inspection, or if in the Engineer's opinion, workmanship is unacceptable, written notice will be given by the Engineer to the Contractor in the form of a punch list, which itemizes necessary planting replacements and/or other deficiencies to be remedied. The Contractor's responsibility for maintenance of all plants shall be extended until replacements are made or other deficiencies are corrected. All plants that do not meet these Acceptance Standards shall be removed from the project within seven days of receipt of the punch list. Replacements shall conform in all respects to the Specifications for new plants and shall be planted in the same manner.
- F. Following the correction of all Punch List deficiencies, the Contractor shall request in writing that the Engineer formally inspect the planting work. If plant materials and workmanship are acceptable, the Engineer will issue a written Certificate of Final Acceptance to the Contractor.

3.4 GUARANTEE

- A. The date of the Certificate of Final Acceptance shall establish the commencement of the required one-year guarantee and establishment period for planting work.
- B. At the end of the guarantee and establishment period, a final inspection will be held to determine whether any plant material replacements are required. Each plant shall be plumb, shall have a character that is natural for its species as determined by the Engineer, and shall conform to the Acceptance Standards described in this Division 2 Section, PLANTING. Plants found to be unacceptable shall be removed promptly from the site and replaced according to this Division 2 Section, PLANTING. A final inspection will be made after the replacement plants have lived through one year.
- C. At the end of the one-year guarantee and establishment period, remove all tree stakes, guys, or anchors installed on trees during the course of the work of this contract.
- D. All replacements shall be plants of the same kind and size specified in the PLANT SCHEDULE. The cost shall be borne by the Contractor, except for possible replacements due to vandalism or neglect on the part of others.

END OF SECTION 02950

DIVISION 3

CONCRETE

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SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. This section of the specifications covers the furnishing and installation of forms for cast-in-place concrete.
- B. Secure to forms as required or set for embedment as required, all miscellaneous metal items, sleeves, reglets, anchor bolts, waterstops, inserts and other items furnished under other Sections and required to be cast into concrete.

1.2 RELATED WORK:

- A. Section 03300, Cast-in-Place Concrete

1.3 REFERENCES:

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

American Concrete Institute (ACI)
ACI 301 Specifications for Structural Concrete for Buildings
ACI 318 Building Code Requirements for Reinforced Concrete
ACI347 Recommended Practices for Concrete Formwork

- B. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply.

1.4 SUBMITTALS

- A. General: Submit in accordance with Condition of Contract and Division 1 – General Requirements Specification Section.
- B. Shop drawings and product data on the following:
 - 1. Location and sequence of the concrete placements. Indicate locations of joints and panel.
 - 2. Sizes and patterns.
 - 3. Form release agent.
 - 4. Form ties.
 - 5. All permanent formwork.

C. Samples

The Contractor shall demonstrate to the Engineer on a designated area of the concrete substructure exterior surface that the form release agent will not adversely affect concrete surfaces to be painted, coated or otherwise finished and will not affect the forming materials.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Forms for exterior and interior surfaces which will be exposed to view after the work is completed, whether such surfaces are painted or unpainted, shall be new plywood stock, steel, tempered masonite, or other materials which will provide smooth concrete surfaces without subsequent surface plastering. Plastic or plastic-faced forms shall not be used, except with the prior approval of the Engineer.
- B. Form ties shall be cone type or equal, wood or plastic, or equal, with waterstop, designed so that after removal or the projecting part no metal shall remain closer than 2-inches to finished face of concrete.
- C. Form release agent shall be a non-staining, non-yellowing, non-toxic liquid free from kerosene and resins of the type recommended by the manufacturer of the forming system being used such as EZ strip by L&M Construction Chemicals, Omaha, NB and "Magic Kote" by Symons Corp., Des Plaines, IL or approved equal.
- D. Where steel adjacent to vertical faces of forms cannot be otherwise secured, mortar doughnuts shall be used to prevent steel from lying too close to the finish vertical faces of the concrete.
- E. Unless otherwise noted on the drawings, all exposed edges of concrete elements shall have a 3/4-in. chamfer. Rustications shall be at the location and shall conform to the details shown on the Drawings. Moldings for chamfers and rustications shall be milled and planed smooth. Rustications and corner strips shall be of a non-absorbent material, compatible with the form surface, and fully sealed on all sides to prohibit the loss of paste or water between the two surfaces.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Surfaces of forms to be in contact with concrete shall be coated with nonstaining form release compound. Wetting will not be accepted as a substitute. Approval of the Engineer shall be obtained before use of coated materials or liners in lieu of form release compound, except as modified herein.

- B. Steel forms shall be thoroughly cleaned and mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface for all forms, except those utilized for surfaces receiving a rough finish. All forms shall have the contact surfaces coated with a release agent.

3.2 CONSTRUCTION:

- A. Forms shall be used for all cast-in-place concrete including sides of footings. Forms shall be constructed and placed so that the resulting concrete will be of the shape, lines, dimensions and appearance indicated on the Drawings.
- B. Formwork shall be so constructed, braced, or tied that the formed surfaces of the concrete will be perfectly true, smooth, and to the dimensions shown on the drawings. All forms used for circular sections shall be true arcs as indicated on the drawings. Short chords will not be acceptable. Form line shall present an uninterrupted surface conforming to radii indicated on the drawings.
- C. Forms shall be sufficiently tight to prevent leakage of mortar, and when necessary shall have temporary openings as required for thorough cleaning, and as required for introduction of concrete to avoid excessive free fall. Panels damaged in stripping or otherwise shall not be reused.
- D. Unless otherwise noted on the design drawings, exposed edges shall have a 3/4-inch chamfer. Chamfer shall not be used where masonry or other material will subsequently be installed flush with one of the adjacent surfaces of the concrete. Where a wash or slope is indicated on the drawings no additional chamfer is required.
- E. The Contractor shall be responsible for safe practices in removing forms and shoring and for placing adequate reshores. Care shall be exercised in the removal of forms to prevent damage to the concrete surfaces.

END OF SECTION 03100

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. This Section covers all concrete and all related items necessary to place and finish the concrete work.
- B. General: Submit in accordance with Condition of Contract and Division 1 – General Requirements Specification Section.

1.2 RELATED WORK:

- A. Section 03100, Concrete Formwork

1.3 REFERENCES:

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

American Concrete Institute (ACI)

ACI 301 Structural Concrete for Buildings

ACI 302 Recommended Practice for Concrete Floor and Slab Construction

ACI 304 Recommended Practice for Measuring, Mixing, Transporting, and
Replacing Concrete

ACI 304.2R Placing Concrete by Pumping Methods

ACI 305 Recommended Practice for Hot Weather Concreting

ACI 306 Recommended Practice for Cold Weather Concreting

ACI 308 Standard Practice for Curing Concrete

ACI 318 Building Code Requirements for Reinforced Concrete

American Society for Testing and Materials (ASTM)

ASTM C31 Making and Curing Concrete Test Specimen.

ASTM C33 Concrete Aggregates

ASTM C39 Compressive Strength of Cylindrical Concrete Specimens

ASTM C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

ASTM C87 Effect of Organic Impurities in Fine Aggregate on Strength of Mortar

ASTM C94 Ready-Mixed Concrete

ASTM C143 Standard Method for Slumps of Portland Cement Concrete

ASTM C150 Portland Cement

ASTM C231 Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C260 Air-Entraining Admixtures for Concrete

ASTM C309 Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C494 Chemical Admixtures for Concrete

- B. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply.

1.4 SUBMITTALS

- A. General: Submit in accordance with Condition of Contract and Division 1 – General Requirements Specification Section.
- B. Six sets of shop drawings of the materials specified herein shall be submitted to the Engineer for review.
- C. Submit sources of cement and aggregates and their conformance to referenced standards.
- D. Provide one copy of the "Certificate of Delivery" for each load of concrete as it arrives on the site, under the provisions of ASTM C94.
- E. Air-entraining admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.
- F. Water reducing admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.
- G. Mid or high range water-reducing admixture (plasticizer). Product data including catalogue cut, technical data, storage requirements, product life, recommended

dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations of use.

- H. Sheet curing material. Product data including catalogue cut technical data and conformity to ASTM standard.
- I. Liquid curing compound. Product data including catalogue cut technical data, storage requirements, product life, application rate and conformity to ASTM standards. Identify proposed locations of use.
- J. Grout. Catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to specified standards.
- K. Submit concrete placing sequence to the Engineer for review and comment.
- L. Test Report
 - 1. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cementitious materials ratio, type and manufacturer of cement.
 - a. Standard deviation data for each proposed concrete mix based on statistical records.
 - b. Water-cementitious materials ratio curve for concrete mixes based on laboratory test. Give average cylinder strength test results at 28 days for laboratory concrete mix designs. Provide results of 7 and 14 day tests if available.
- M. Certifications
 - 1. Certify that admixtures used in the same concrete mix are compatible with each other and the aggregates.
 - 2. Certify that the Contractor is not associated with the independent testing laboratory nor does the Contractor or its officers have a beneficial interest in the laboratory.
- N. Qualifications
 - 1. Independent testing laboratory: Name, address and qualifications. Laboratories affiliated with the Contractor or in which the Contractor or corporate officers have a beneficial interest are not acceptable.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Sheet Curing Materials: Store in weathertight buildings or off the ground and under cover.
- B. Grout: Non-shrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.

1.6 QUALITY ASSURANCE

- A. Only one source of cement and aggregates shall be used on any one structure. Concrete shall be uniform in color and appearance.
- B. Damages and imperfections shall be corrected by the Contractor to the satisfaction of the Engineer at no additional cost to the Owner.
- C. All field-testing and inspection services required shall be provided by the Owner. The cost of such work, except as specifically stated otherwise, shall be paid for by owner. Methods of testing shall comply in detailed with the latest applicable ASTM method.
- D. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at the Contractor's expense.
- E. If, during the progress of the work, the materials from the sources originally accepted change in characteristics, the Contractor shall, at the Contractor's expense, make new acceptance tests of aggregates and establish new design mixes. Such testing and design shall be accomplished with the assistance of a certified independent testing laboratory, retained by the Contractor, acceptable to the Engineer.

1.7 DEFINITION

- A. Non-shrink grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base material surface.

PART 2 - PRODUCTS

2.1 CEMENT:

- A. The cement shall be an approved brand of American manufactured Portland Cement, Type II conforming to ASTM C150. The brand name and type of cement proposed for use shall be submitted to the Engineer for approval immediately following award of contract. Only one color of cement, all of the same manufacture, shall be used for the work.
- B. When the use of Portland cement Type III is permitted by the Engineer the same strength requirements shall apply, but the indicated strengths shall be attained in 7 days instead of 28 days.

2.2 AGGREGATES:

- A. Except as otherwise noted, aggregates shall conform to the requirements of ASTM C33.

- B. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33 and the following additional requirements:

Sieve	Retained Percent
#4	0 to 5
#16	25 to 40
#50	70 to 87
#100	93 to 97
Fineness Modulus	2.80 (\pm 0.20)
Organic	Plate 2 maximum
Silt	2.0% maximum
Mortar Strength	100% minimum
Soundness	Compression ratio 5% maximum loss, magnesium Sulfate, five cycles

- C. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33 and the following additional requirements:

Designated Size (inches)	3	2	1-1/2	1	3/4	1/2	3/8
Fineness Modulus (\pm -0.20)	7.95	7.45	7.20	6.95	6.70	6.10	4.50
Organic	Plate 1 maximum						
Silt	1.0% maximum						
Soundness	5% maximum loss, magnesium Sulfate, five cycles						

Grading requirements shall be as listed in ASTM C33, Table 2 for the size number corresponding to the appropriate maximum coarse aggregate size. Limits of Deleterious Substances and Physical Property Requirements shall be as listed in ASTM C33, Table 3 for severe weathering regions. Size numbers for the concrete mixes shall be as shown in Table 03300-1.

TABLE 03300-1

Description	Maximum Coarse Aggregate Size	Size Number (ASTM C33 Table 2)
24-in thick or greater	1-1/2-in	467
Greater than 12-in thick	1-in	57
12-in thick or less	3/4-in	67
Peastone mix	3/8-in	8

2.3 WATER:

- A. Water shall be potable. Water for curing shall not contain any substance injurious to concrete, or which causes staining.

2.4 ADMIXTURES

- A. Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures.
 - 1. Air entraining agent shall be in accordance with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
 - 2. Water reducing agent shall be a mid-range water reducer meeting ASTM C494, Type A, and contain no more than .05% chloride ions. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
 - 3. Superplasticizer agent shall be in accordance with ASTM C494, Type F or Type G and contain no more than 0.05% chloride ions. Product may be plant added or field added based on the best application considering distance, temperature and time. The treated concrete shall be capable of maintaining plastic state for two hours or longer depending on application. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
 - 4. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the Engineer. When allowed, the admixtures shall be retarding or accelerating water reducing or high range water reducing admixtures.
 - 5. Prohibited admixtures: Calcium chloride, thiocyanates and admixtures containing more than 0.05% chloride ions are not permitted.

2.5 MIXES

- A. Development of mix designs and testing shall be by an independent testing laboratory acceptable to the Engineer engaged by and at the expense of the Contractor.
- B. Select properties of ingredients to meet the design strength and materials limits specified in Tables 03300-2 and 03300-3 and to produce concrete having proper placeability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.
- C. The design mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if not available, be developed by laboratory test. Water content of the concrete shall be based on a curve showing the relation between water cementitious ratio and 7 and 28 day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing a average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield

the desired data, including the compressive strength specified, without extrapolation. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratios and net minimum cementitious content as specified in Table 03300-3.

TABLE 03300-2

<u>Design Strength*</u>	<u>Minimum Lab Strength at 7 Days</u>
3000 psi	2100 psi
4000 psi	2800 psi

*Specified compressive strength at 28 days

In no case, however, shall the resulting mix conflict with the limiting values for maximum water content and net minimum cement factor specified in Table 03300-3.

- D. The limiting strengths, cement factors and water contents for each mix shall be in accordance with Table 03300-3.

TABLE 03300-3

<u>Minimum 28 Day Design Strength</u>	<u>Net Minimum Cement Factor* Content in (100 lbs/cy)</u>	<u>Maximum Water Content** gals/100 lbs of Cement</u>	<u>Maximum Water-Cementitious Materials Ratio (by weight)</u>
3000	6.11	6.4	0.58
4000	6.3	5.4	0.45
Pumped Concrete	6.3		0.45

* Minimum. Increase as necessary to meet other requirements. These cement factors apply to “controlled” concrete subject to specific inspection.

** Maximum. Decrease if possible. This represents total water in mix at time of mixing, including free water on aggregates and water in admixture solutions.

- E. Compression Test: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the compression strength requirements in conformity with the provisions of ACI 318.
- F. Entrained air, as measured by ASTM C231, shall be as shown in Table 03300-4.

TABLE 0033-4

<u>Concrete Placement</u>	<u>Total Air Measured at Discharge From Truck (Percent)</u>
Trowel finished slabs	3.5 maximum
All other concrete	4-6

1. If the air entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal required under Paragraph 1.04.
- G. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 03300-5. If plasticizer is used, the slump indicated shall be that measured before plasticizer is added. Plasticized concrete shall have a maximum slump of eight inches.

TABLE 03300-5

<u>Portion of Structure</u>	<u>Slump (inches) Recommended</u>	<u>Range</u>
Pavement and slabs on ground	2	1-3
Plain footings, slabs, beams		
Pads, curbs and sludge tank walls	2-3	1-4
Heavy reinforced foundation Walls and footings	3-4	2-5
Thin reinforced wall and columns	4	3-5

- H. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

2.6 CONCRETE

- A. Concrete conforming to the requirements listed below shall be used where indicated on the drawings. Unless otherwise indicated, concrete fill and concrete used as fill under foundations (mud slab), and elsewhere approved by the Engineer, shall be the 4,000 psi mix.

CONCRETE STRENGTHS

Minimum Comp. Strength at 28 days (psi)	Maximum Water/ Cement Ratio Gallons per bag of cement)*	Cement Factor: 94 lb. bags Per cubic yard minimum**
3000	0.59 (6.9)	5.5
4000	0.48 (5.6)	6.5

* Based on air-entrained concrete. If non-air-entrained concrete is called for, the listed maximum water/cement ratios may be increased slightly, as approved by the Engineer. The water is the total water in the mix, including free water on the aggregate.

** These are minimum amounts; increase as necessary to meet mix requirements.

- B. Concrete shall conform to ASTM C94. One copy of the Certificate of Delivery required by ASTM C94 shall be delivered to the Engineer immediately upon arrival of each load of concrete at the site. The Contractor shall be responsible for the design of the concrete mixtures.
- C. Standard compression tests in conformity with the provisions of ACI 318 of all proposed mixes shall be made by the testing laboratory or other satisfactory evidence shall be presented that the design mixes will attain the minimum strengths listed on the design drawings or called for herein, within the limitations of the ACI Code. No concrete shall be delivered to the job site until the Engineer has approved the design mixes.
- D. All concrete (unless otherwise directed) shall contain an air-entraining agent. Air entrained concrete shall have an air content by volume, measured at discharge from truck, of 3 to 6 percent for 1-1/2-inch aggregate and 4 to 8 percent for 3/4-inch aggregate. The air content shall be the responsibility of the testing laboratory and in accordance with ASTM C231.
- E. All concrete shall contain a mid-range water reducer to minimize cement and water content of the mix, at the specified slump, in accordance with ASTM C494.
- F. Slump for all concrete shall be from 3-inch to 4-inch, except for concrete using a superplasticizer, when the maximum slump shall be 8 inches. Any concrete having a slump greater than 4 inches (7 inches with superplasticizer) shall be promptly removed from the site.
- G. No calcium chloride or admixtures containing calcium chloride shall be added to the concrete. No admixture other than those specified shall be used in concrete without the specific written permission of the Engineer in each case.
- H. No additional water, except for the amount indicated by the design mix shall be added to the concrete without the prior permission of the Engineer.

2.7 GROUT:

- A. Non-metallic, non-shrink grout shall be pre-mixed, non metallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensation agents, plasticizing and water reducing agents, complying with CRD-C588.

2.8 CURING MATERIALS:

- A. Curing compound shall be a curing/hardener compound such as Acurion by AntiHydro, Sikaguard Cure/Hard by Sika, Super Diamond Clear by Euclid or approved equal. Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309 Type 1-D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Under no circumstances shall concrete which has set or partially set before placing be used; and no retempering of concrete or grout will be permitted.
- B. The batching, mixing, transporting, placing and curing of concrete shall be subject to the inspection of the Engineer at all times. The Contractor shall advise the Engineer of his readiness to proceed at least six working hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing and the alignment, cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the Engineer.
- C. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:
 - 1. The gradation of aggregate
 - 2. The proportion of fine and coarse aggregate.
 - 3. The percentage of entrained air, within the allowable limits.
- D. Furnish a delivery ticket for ready mixed concrete to the Engineer as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any wage is added and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of transit mix trucks.

3.2 PREPARATION:

- A. Before placing concrete, forms and the space to be occupied by the concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint or other material which would tend to reduce the bond.
- B. Earth, concrete, masonry, or other water-permeable material against which concrete is to be placed shall be thoroughly saturated with water immediately before concrete is placed. No concrete shall be placed until the consolidation of the ground and the arrangement and details of forms and reinforcing have been inspected and approved by the Engineer.
- C. When joining fresh concrete to concrete which has attained full set, the latter shall be cleaned by chipping, roughen to a ¼ inch amplitude, and washing off all dirt, scum and laitance. It then shall be moistened prior to placing new concrete.

3.3 MIXING AND TRANSPORTATION:

- A. Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C94, except as otherwise specified. Truck mixers, agitators, and non-agitating units shall comply with National Ready-Mix Concrete Association (NRMCA) and Truck Mixer Manufacturers' Bureau (TMMB). Ready-mix plant equipment and facilities shall be certified in accordance with NMRCA QC 3. Site-mixed concrete shall be mixed in accordance with ACI 301. On-site plant shall conform to the NRMCA CPMB 100.
- B. No water from the truck system or elsewhere shall be added after the initial introduction of mixing water for the batch except when on arrival at the jobsite, the slump of the concrete is less than that specified. Water added to bring the slump within the specified range shall not change the total water in the concrete to a point that the approved water-cement ratio is exceeded. The drum shall be turned an additional 30 revolutions, or more, if necessary, until the added water is uniformly mixed into the concrete. Water shall not be added to the batch at any later time.
- C. Ready-mix or transit-mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities for the respective conditions as stated on the name plate. Discharge at the site shall be within 1-1/2 hours after cement was first introduced into the mix. Central mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the pre-mixed concrete is placed in the truck and shall continue without interruption until discharge. Transit-mixed concrete shall be mixed at mixing speed for at least 10 minutes immediately after charging the truck, followed by agitation without interruption until discharged.
- D. All central plant and rolling stock equipment and methods shall conform to the latest Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready-Mixed Concrete Association, as well as ACI 304 and ASTM C94.
- E. Attention is called to the importance of dispatching trucks from the batching plant so that they shall arrive at the site of the work just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.
- F. Concrete shall be discharged within 1-1/2 hours after introduction of the cement to the aggregates, except that when the concrete temperature exceeds 85 degrees F, this time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after it has been discharged from the truck.
- G. Temperature and Mixing Time Control:
 - 1. In cold weather, maintain the as-mixed temperature of the concrete and concrete temperatures at the time of placement in the forms as indicated in Table 03300-6.

2. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees F.
3. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees F. If necessary, substitute well-crushed ice for all or part of the mixing water.
4. The maximum time interval between the addition of mixing water and/or cement to the batch, and the placing of concrete in the forms shall not exceed the following:

TABLE 03300-6

AIR OR CONCRETE TEMPERATURE (WHICHEVER IS HIGHER)	MAXIMUM TIME
80 degrees F to 90 degrees F	45 minutes
70 degrees F to 79 degrees F	60 minutes
40 degrees F to 69 degrees F	90 minutes

If an approved mid or high range water reducer (plasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes or other appropriate time such that workability and Contractor's ability to properly place the concrete will not be adversely compromised.

3.4 INSTALLATION/APPLICATION/ERECTION:

A. PLACING:

1. Verify that all formwork completely encloses concrete to be poured and is securely braced prior to concrete placement. Remove ice, excess water, dirt and other foreign materials from form. Confirm that reinforcement and other embedded items are securely in place.
2. No concrete shall be placed by pumping methods without the prior written approval of the Engineer. Should the Contractor be allowed to place concrete by pumping methods, procedures, mix design of concrete, and all other precautions shall be in accordance with ACI 304.2R and as approved by the Engineer.
3. Concrete shall be placed in alternate areas, as defined by the construction and control joints indicated on the design drawings. A minimum of 3 days shall elapse between placement of adjacent sections.
4. Deposit concrete as near its final position as possible to avoid segregation due to re-handling or flowing. Should any segregation occur, the concrete shall be remixed before it is placed. Concrete shall be placed in the forms in horizontal layers not over 1 to 2 feet thick. Concrete shall not be allowed to drop freely more than 4 feet. If the free drop to the point of placement must exceed 4 feet, the Contractor shall obtain the approval of the Engineer for the proposed method of depositing the concrete. The concrete shall not be required to flow over distances greater than 3 feet in any direction in the forms or on the ground, unless

otherwise permitted by the Engineer.

5. Do not place concrete for supported elements until concrete previously placed in the supporting element (column, slabs and/or walls) has reached 70% of its 28 day strength.
6. Unless otherwise noted, the work begun on any day shall be completed in daylight of the same day.
7. "Cold Joints" are to be avoided, but if they occur, they are to be treated as bonded construction joints.
8. Chutes for conveying concrete shall be of U-shaped design and sized to insure a continuous flow of concrete. Flat (coal) chutes shall not be employed. Chutes shall be metal or metal-lined, and each section shall have approximately the same slope. The slope shall not be less than 25 nor more than 45 degrees and shall be such as to prevent segregation of the ingredients. The discharge end of the chute shall be provided with a baffle plate or spout to prevent segregation. If the discharge end of the chute is more than 5 feet above the surface of the concrete in the forms, a spout shall be used and the lower end maintained as near the surface of deposit as practicable. When the operation is intermittent, the chute shall discharge into a hopper. Chutes shall be thoroughly cleaned before and after each run, and the debris and any water shall be discharged outside the forms. Concrete shall not be allowed to flow horizontally more than 5 feet.
9. Concrete during and immediately after depositing shall be thoroughly compacted by means of suitable tools. Internal type mechanical vibrators shall be employed to produce the required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be carried on long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents or "pumping" or migration of air. All vibrators shall be supplemented by proper wooden spade puddling adjacent to forms to remove included bubbles and honeycomb. This is essential for the top lifts of walls. All vibrators shall travel at least 10,000 rpm and be of adequate capacity. At least one vibrator shall be used for every 10 cubic yards of concrete per hour. In addition, one spare vibrator in operating condition shall be on the site.
10. Concrete slabs on the ground shall be well-tamped into place and foundation material shall be wet, tamped, and rolled until thoroughly compacted prior to placing concrete.
11. Concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section. If a section cannot be placed continuously, construction joints may be located at points as provided for in the drawings or approved by the Engineer.

12. Chutes, hoppers, spouts, adjacent work, etc., shall be thoroughly cleaned before and after each run, and the water and debris shall not be discharged inside the form.

B. CONCRETE PLACING DURING COLD WEATHER:

1. For this Specification, cold weather is defined as a period when for more than three successive days, the average daily outdoor temperature drops below 40 degrees F. The average daily temperature shall be calculated as the average of the highest and the lowest temperature during the period from midnight to midnight
2. Concrete placed during cold weather shall be batched, delivered, placed, cured and protected to compliance with the recommendations of ACI 306R and the additional requirements of this section.
3. Concrete shall not be placed on frozen ground, and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 40oF, or is expected to fall to below 40 degrees F, within 72 hours, and the concrete after placing shall be protected by covering, heat, or both. No accelerant shall be used to prevent freezing.
4. The temperature of concrete surfaces shall not be permitted to drop below 50 degrees F. for at least 7 days after placement of the concrete.
5. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer. All procedures shall be in accordance with provisions of ACI 306. Cold weather concreting shall not begin until the work plan is acceptable to the Engineer.

C. CONCRETE PLACING DURING HOT WEATHER:

1. For this Specification, hot weather is defined as any combination of high air temperatures, low relative humidity, and wind velocity which produces a rate of evaporation as estimated in ACI 305R, approaching or exceeding 0.2 pounds per square foot per hour.
2. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. The Contractor shall make every effort to minimize delays which will result in excessive mixing of the concrete after arrival on the job.
3. During periods of excessively hot weather (90 degrees F, or above) ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 90 degrees F, when ready for placement will not be acceptable, and will be

rejected.

4. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. The record shall include checks on temperature of concrete as delivered and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.
5. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
6. Wet form, particularly metal deck, before placing concrete.
7. Keep permanent temperature record showing date and outside temperature for concreting operations. Thermometer reading shall be taken at start of work in morning, at noon, and again late in afternoon. Locations of concrete placed during such periods shall likewise be recorded, in such manner as to show any effect temperatures may have had on construction. Copies of temperature record shall be distributed daily to Owner.

D. COMPACTING

1. Concrete during and immediately after depositing shall be thoroughly compacted by means of suitable tools. Internal type mechanical vibrators shall be employed to produce the required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be carried on long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents or "pumping" or migration of air. All vibrators shall be supplemented by proper wooden spade puddling adjacent to forms to remove included bubbles and honeycomb. This is essential for the top lifts of walls. All vibrators shall travel at least 10,000 rpm and be of adequate capacity. At least one vibrator shall be used for every 10 cu. yd. of concrete per hour. In addition, one spare vibrator in operating condition shall be on the site.

E. CURING:

1. Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the placement prior to placing concrete. No fire or excessive heat shall be permitted near or in direct contact with the concrete at any time. Concrete curing shall be performed as specified in ACI 301 and as stated herein. All curing procedures shall have prior approval of the Engineer.

2. Curing procedure shall be continued for at least 7 days.
 - a. Moisture loss from surface placed against metal or wood forms shall be minimized by keeping forms wet until removal.
 - b. Curing shall be continued for at least 7 days. When forms are removed during the curing period, surfaces shall be cured by spraying or by the use of a curing compound as previously specified.
 - c. Surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary, 1/2-inch thick plywood sheets shall be used to protect the exposed surface.

F. TESTING:

1. Concrete inspection and testing shall be performed by an independent inspection laboratory, engaged and paid for by the Contractor. The Engineer shall approve the inspection laboratory before concrete work commences. Testing equipment shall be supplied by the laboratory, and the preparation of samples and all testing shall be performed by the laboratory personnel. Full assistance and cooperation, concrete for samples, and such auxiliary personnel and equipment as needed shall be provided by the Contractor.
2. At least one slump test shall be performed from each truck load of concrete. The sample for slump shall be taken from the middle third of a truck load. Air content tests shall be made at the discretion of the Engineer. If the measured slump or air content falls outside the specified limits, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed the requirements of the specification and shall be immediately removed from the jobsite to be discarded.
3. The Contractor shall advise the Engineer of his readiness to proceed with concrete placement at least one working day prior to each placement. The Engineer will inspect the preparations for concrete, including the preparation of previously placed concrete, the reinforcing, and the alignment and tightness of formwork. No placement shall be made without the prior approval of the Engineer.
4. A minimum of four standard compression test cylinders shall be made and tested for each 100 cubic yards or fraction thereof for each type and design strength of concrete from each day's placement of concrete. One cylinder shall be tested at 7 days and two cylinders at 28 days. The fourth cylinder from each set shall be kept until the 28 day test report on the second and third cylinders in the same set has been received. The Engineer reserves the right to require test cylinders to be made for each truckload of concrete if the nature of the project or project experience indicates such additional tests are required for proper control of concrete quality.

5. The strength level shall be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test (average of two cylinders) result falls below the specified strength by more than 500 psi.
6. In the event the average compressive strength of the two 28 day cylinders does not achieve the required level, the Engineer may elect to test the fourth cylinder immediately or test it after 56 days.

G. FAILURE TO MEET REQUIREMENTS:

1. The Engineer shall have the right to reject concrete represented by low strength tests or to agree to further testing of the concrete. Rejected concrete shall be promptly removed and replaced with concrete conforming to the specification. The decision of the Engineer as to whether substandard concrete is to be accepted or rejected or additional tests shall be conducted shall be final. All direct and indirect costs associated with further curing and testing of the concrete shall be at the Contractor's expense.
2. If the Engineer agrees to consider further curing and/or testing of the concrete before making a final decision, the Contractor shall submit a detailed plan to the Engineer, including proposed criteria for acceptance of the concrete. The plan may include additional curing of the concrete, drilling and testing of cores, load testing of the structure, or a combination.
3. If additional curing is permitted before further inspection and testing, the Contractor shall provide any necessary materials and labor to further cure the suspect concrete.
4. If drilling and testing of cores is permitted, the Contractor shall be responsible for obtaining the cores, including provision of ladders, scaffolding, and such incidental equipment as may be required. If additional curing is permitted, cores shall be drilled after the curing period, and shall be in accordance with ASTM Methods C39 and C42. The Contractor shall repair all core holes to the satisfaction of the Engineer.
5. The burden of proof, including, but not limited to the work of cutting and testing the cores, inspection, evaluation, engineering, repair of the holes, or removal and replacement of the concrete in question, and all associated costs therefore, shall be at the expense of the Contractor.
6. If the suspect concrete still fails to meet specification requirements, the Engineer shall have the right to reject the concrete, have it removed and replaced, in accordance with paragraph 5 above, or to require mechanical strengthening of the concrete to satisfy project requirements. The Contractor shall submit a removal and replacement plan for review by the Engineer.

END OF SECTION 03300

APPENDIX A

Boring Logs & Railroad Crossing Report

BORING LOG					B-1
Project: Weymouth LCI Location: Weymouth, MA Client: Town of Weymouth Driller: New England Boring Contractors Drilling Methods: ATV Drill Rig, hollow stem augers or drive and wash methods continuous soil sampling (2FT split spoons) Weather: Warm with clear skies Performed SMB Date: 9/28/2023			See Boring Plan		Description: EP conducted a geotechnical investigation along the sewer alignment consisting of up to ten (10) soil borings. Borings were to be drilled to a proposed depth of 10 FT below the pipe invert or refusal. The borings were advanced using hollow stem augers/drive and wash methods depending on the underlying soil conditions and the groundwater levels. The SPT was recorded at each sampling interval accordance with ASTM D1586. EP logged the borings and performed a visual soil classification in accordance with ASTM D2488. Project No. R290-2101.00
Depth (feet)	Sample No.	SPT	Recovery (in)	Soil Description	Notes
0-2	S-1	2-2-3-5	16/24	10" Loose, dark brown, fine silty sand, few gravel, damp, non-plastic, 6" Dense, medium brown, majority fine silty sand, some coarse grains, appearance was marbled sand/weathered rock deposits, damp, non-plastic.	
2-4	S-2	7-5-6-7	4/24	Dense, medium brown, majority fine silty sand, some coarse grains, appearance was marbled sand/weathered rock deposits, damp, non-plastic.	
4-6	S-3	2-3-1-1	2/24	Dense, brown, majority fine to medium silty sand, some coarse grains/small gravel, wet, non-plastic.	Water Table
6-8	S-4	2-2-7-1	15/24	3" Dense, brown, majority fine to medium silty sand, some coarse grains/small gravel, wet, non-plastic, 12" Dense, brown, fine silty sand with iron staining, wet, low plasticity.	
8-10	S-5	6-6-24-31	24/24	4" Dense, dark brown, fine silty sand with some organics, damp, high plasticity*, 6" Loose, brown/iron stained, fine to medium sand with some flat, sharp rock deposits (shale), wet, non plastic, 2" Dense, tan, fine to medium sand, wet, non plastic, 8" Dense, brown/iron stained, fine to medium sand, some coarse grain deposits and small gravel, wet, non plastic, 2" Loose, gray, fine to coarse silty sand, some small gravel, wet, non plastic.	0-4" "Loam" consistency*
10-12	S-6	21-32 Refusal	18/24	4" Dense, dark brown, fine silty sand with some organics, damp, high plasticity*, 3" Loose, brown, fine to medium silty sand, wet, non plastic, 3" Loose, brown, fine to coarse sand, majority sharp weathered rock deposits (shale), wet, non plastic, 5" Dense, brown, fine sand with few medium deposits, few weathered rock deposits, wet, non plastic, 1" Dense, brown, fine sand with weathered rock deposits, wet, non plastic.	0-4" "Loam" consistency*
Boring Terminated @ 12' Below Grade					
NOTES: CORE LOG (5 FT CORE) Core (feet) Time (mins) 12-13 FT 7.10 13-14 FT 4.07 14-15 FT 7.07 15-16 FT 5.22 16-17 FT 6.19			LEGEND S - Split Spoon Sample O/A - Sample Collected Off the Augers UT - Undisturbed Tube Sample Trace - Approximately 0 to 10% Some - Approximately 20 to 35% Little - Approximately 10 to 20% And - Approximately 35 to 50% 0-10 Coarse Soil N Value - Loose 30-50 Coarse Soil N Value - Dense 10-30 Coarse Soil N Value - Medium Dense >50 Coarse Soil N Value - Very Dense 0-4 Fine Soil N Value - Soft 8-15 Fine Soil N Vil N Value - Hard 4-8 Fine Soil N Value - Medium Stiff 15-30 Fine Soil N Value - Very Stiff		
ENVIRONMENTAL PARTNERS			Page 1 of 1		

BORING LOG**B-5A**

Project: Weymouth LCI
Location: Weymouth, MA
Client: Town of Weymouth
Driller: New England Boring Contractors
Drilling Methods:
ATV Drill Rig, hollow stem augers
or drive and wash methods
continuous soil sampling (2FT split spoons)
Weather: Warm with clear skies

See Boring Plan

Description:
EP conducted a geotechnical investigation along the sewer alignment consisting of up to ten (10) soil borings. Borings were to be drilled to a proposed depth of 10 FT below the pipe invert or refusal. The borings were advanced using hollow stem augers/drive and wash methods depending on the underlying soil conditions and the groundwater levels. The SPT was recorded at each sampling interval accordance with ASTM D1586. EP logged the borings and performed a visual soil classification in accordance with ASTM D2488.

Project No. R290-2101.00

Performed SMB
Date: 9/28/2023

<i>Depth (feet)</i>	<i>Sample No.</i>	<i>SPT</i>	<i>Recovery (in)</i>	<i>Soil Description</i>	<i>Notes</i>
0-2	S-1	3-3-5-19	4/24	Loose, dark brown, fine silty sand, damp, some organics, non-plastic.	
2-4	S-2	32-60-49-20	0/24	No recovery	Water table
4-5.5	S-3	35-42-25-45 Refusal	14/24	Dense, dark brown/iron stained, poorly sorted fine to coarse silty sand, some sharp gravel, wet, non-plastic.	

Boring Terminated @ 5.5' Below Grade

NOTES:**LEGEND**

S - Split Spoon Sample	O/A - Sample Collected Off the Augers
UT - Undisturbed Tube Sample	
Trace - Approximately 0 to 10%	Some - Approximately 20 to 35%
Little - Approximately 10 to 20%	And - Approximately 35 to 50%
0-10 Coarse Soil N Value - Loose	30-50 Coarse Soil N Value - Dense
10-30 Coarse Soil N Value - Medium Dense	>50 Coarse Soil N Value - Very Dense
0-4 Fine Soil N Value - Soft	8-15 Fine Soil N Value - Hard
4-8 Fine Soil N Value - Medium Stiff	15-30 Fine Soil N Value - Very Stiff

BORING LOG					B-5B
Project: Weymouth LCI Location: Weymouth, MA Client: Town of Weymouth Driller: New England Boring Contractors Drilling Methods: ATV Drill Rig, hollow stem augers or drive and wash methods continuous soil sampling (2FT split spoons) Weather: Warm with clear skies Performed E SMB Date: 9/27/2023				See Boring Plan	Description: EP conducted a geotechnical investigation along the sewer alignment consisting of up to ten (10) soil borings. Borings were to be drilled to a proposed depth of 10 FT below the pipe invert or refusal. The borings were advanced using hollow stem augers/drive and wash methods depending on the underlying soil conditions and the groundwater levels. The SPT was recorded at each sampling interval accordance with ASTM D1586. EP logged the borings and performed a visual soil classification in accordance with ASTM D2488. Project No. R290-2101.00
Depth (feet)	Sample No.	SPT	Recovery (in)	Soil Description	Notes
0-2	S-1	3-2-5-8	12/24	4" Loose, dark brown, fine silty sand, some organics, damp, non-plastic, 8" Dense, medium brown, fine silty sand, some gravel, damp, low-med plasticity*.	Holds shape*
2-4	S-2	10-13-25-50	14/24	14" Loose, medium brown, fine to coarse silty sand with some gravel and weathered rock deposits, damp, non-plastic.	
4-6	S-3	60-33-Refusal	4/24	Dense, medium brown, fine to coarse silty sand, poorly sorted, abundant gravel, wet, non-plastic.	Water Table
6-7.5	S-4	47-26-Refusal	4/24	Dense, medium brown, fine to coarse silty sand, poorly sorted, abundant gravel, wet, non-plastic.	
Boring Terminated @ 7.5' Below Grade					
NOTES: CORE LOG (3 FT CORE) <div> <div>Core (feet)</div> <div>Time (mins)</div> </div> 7.5-8.5 FT 14.52 8.5-9.5 FT 13.03 9.5-10.5 FT -				LEGEND <div> <div>S - Split Spoon Sample</div> <div>UT - Undisturbed Tube Sample</div> </div> <div> <div>Trace - Approximately 0 to 10%</div> <div>Little - Approximately 10 to 20%</div> <div>0-10 Coarse Soil N Value - Loose</div> <div>10-30 Coarse Soil N Value - Medium Dense</div> <div>0-4 Fine Soil N Value - Soft</div> <div>4-8 Fine Soil N Value - Medium Stiff</div> </div> <div> <div>O/A - Sample Collected Off the Augers</div> <div>Some - Approximately 20 to 35%</div> <div>And - Approximately 35 to 50%</div> <div>30-50 Coarse Soil N Value - Dense</div> <div>>50 Coarse Soil N Value - Very Dense</div> <div>8-15 Fine Soil N Value - Hard</div> <div>15-30 Fine Soil N Value - Very Stiff</div> </div>	
ENVIRONMENTAL PARTNERS					Page 1 of 1

BORING LOG					B-6B		
<div>Project: Weymouth LCI Location: Weymouth, MA Client: Town of Weymouth Driller: New England Boring Contractors Drilling Methods: ATV Drill Rig, hollow stem augers or drive and wash methods continuous soil sampling (2FT split spoons) Weather: Warm with clear skies Performed SMB Date: 9/27/2023</div>				<div>See Boring Plan</div>		<div>Description: EP conducted a geotechnical investigation along the sewer alignment consisting of up to ten (10) soil borings. Borings were to be drilled to a proposed depth of 10 FT below the pipe invert or refusal. The borings were advanced using hollow stem augers/drive and wash methods depending on the underlying soil conditions and the groundwater levels. The SPT was recorded at each sampling interval accordance with ASTM D1586. EP logged the borings and performed a visual soil classification in accordance with ASTM D2488. Project No. R290-2101.00</div>	
Depth (feet)		Sample No.	SPT	Recovery (in)	Soil Description		Notes
0-2		S-1	1-1-2-2	8/24	6" Loose, dark brown, fine sand, some organics, dry, non-plastic*, 2" Loose, medium brown, fine sand, dry, non-plastic.		*Top Soil
2-4		S-2	10-27-25-25	9/24	9" Loose, light brown, fine to coarse sand, some gravel, dry, non-plastic.		
4-6		S-3	30-32-41-36	16/24	3" Dense, gray and brown, fine silty sand, dry, non-plastic, 13" Loose, gray, weathered rock, dry.		
6-6.6		S-4	40-Refusal	6/24	3" Dense, gray and brown marbeled, fine silty sand, dry, low-medium plasticity*, 3" Loose, gray, weathered rock, dry.		*Holds shape
Boring Terminated @ 6.6' Below Grade							
<div>NOTES: No Water Table Encountered</div>				LEGEND			
				S - Split Spoon Sample		O/A - Sample Collected Off the Augers	
				UT - Undisturbed Tube Sample			
				Trace - Approximately 0 to 10%		Some - Approximately 20 to 35%	
				Little - Approximately 10 to 20%		And - Approximately 35 to 50%	
				0-10 Coarse Soil N Value - Loose		30-50 Coarse Soil N Value - Dense	
				10-30 Coarse Soil N Value - Medium Dense		>50 Coarse Soil N Value - Very Dense	
				0-4 Fine Soil N Value - Soft		8-15 Fine Soil N Vail N Value - Hard	
4-8 Fine Soil N Value - Medium Stiff		15-30 Fine Soil N Value - Very Stiff					
ENVIRONMENTAL PARTNERS							
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BORING LOG

B-7

Project: Weymouth LCI
 Location: Weymouth, MA
 Client: Town of Weymouth
 Driller: New England Boring Contractors
 Drilling Methods:
 ATV Drill Rig, hollow stem augers
 or drive and wash methods
 continuous soil sampling (2FT split spoons)
 Weather: Warm with clear skies

 Performed SMB
 Date: 9/26/2023

See Boring Plan

Description:
 EP conducted a geotechnical investigation along the sewer alignment consisting of up to ten (10) soil borings. Borings were to be drilled to a proposed depth of 10 FT below the pipe invert or refusal. The borings were advanced using hollow stem augers/drive and wash methods depending on the underlying soil conditions and the groundwater levels. The SPT was recorded at each sampling interval accordance with ASTM D1586. EP logged the borings and performed a visual soil classification in accordance with ASTM D2488.

 Project No. R290-2101.00

Depth (feet)	Sample No.	SPT	Recovery (in)	Soil Description	Notes
0-2	S-1	2-5-8-6	9/24	Loose, dark brown, fine sand, some organics, few gravel, dry, non-plastic*.	*Top Soil
2-4	S-2	11-13-16-18	14/24	8" Dense, dark brown/tan, silty sand, poorly sorted with some sharp gravel, dry, low-medium plasticity*, 6" Dense, dark brown/tan, silty sand, poorly sorted with some sharp gravel, wet, low-medium plasticity**.	*Holds some shape **Easily breaks apart Water Table
4-5.5	S-3	29-60-Refusal	12/24	6" Dense, dark brown/tan, silty sand, poorly sorted with some sharp gravel, wet, low-medium plasticity, 6" Dense, medium brown, silty sand, poorly sorted with some sharp gravel, wet, low-medium plasticity.	

Boring Terminated @ 5.5' Below Grade

NOTES:

LEGEND

S - Split Spoon Sample	O/A - Sample Collected Off the Augers
UT - Undisturbed Tube Sample	
Trace - Approximately 0 to 10%	Some - Approximately 20 to 35%
Little - Approximately 10 to 20%	And - Approximately 35 to 50%
0-10 Coarse Soil N Value - Loose	30-50 Coarse Soil N Value - Dense
10-30 Coarse Soil N Value - Medium Dense	>50 Coarse Soil N Value - Very Dense
0-4 Fine Soil N Value - Soft	8-15 Fine Soil N Value - Hard
4-8 Fine Soil N Value - Medium Stiff	15-30 Fine Soil N Value - Very Stiff

BORING LOG					B-8		
<div>Project: Weymouth LCI Location: Weymouth, MA Client: Town of Weymouth Driller: New England Boring Contractors Drilling Methods: ATV Drill Rig, hollow stem augers or drive and wash methods continuous soil sampling (2FT split spoons) Weather: Warm with clear skies Performed SMB Date: 9/26/2023</div>				<div>See Boring Plan</div>		<div>Description: EP conducted a geotechnical investigation along the sewer alignment consisting of up to ten (10) soil borings. Borings were to be drilled to a proposed depth of 10 FT below the pipe invert or refusal. The borings were advanced using hollow stem augers/drive and wash methods depending on the underlying soil conditions and the groundwater levels. The SPT was recorded at each sampling interval accordance with ASTM D1586. EP logged the borings and performed a visual soil classification in accordance with ASTM D2488. Project No. R290-2101.00</div>	
Depth (feet)		Sample No.	SPT	Recovery (in)	Soil Description		Notes
0-2		S-1	1-1-1-1	4/24	Loose, dark brown, fine sand, some organics, few gravel, dry, non-plastic*.		*Top Soil
2-4		S-2	2-7-8-12	9/24	5" Loose, dark brown, fine sand, some organics, few gravel, dry, non-plastic*, 4" Dense, medium brown, fine to medium silty sand with some assorted sharp gravel, wet, non-plastic.		*Top Soil Water Table
4-5.9		S-3	16-23-28-Refusal	12/24	10" Dense, medium brown, fine to medium silty sand with some abundant, poorly sorted sharp gravel, wet, non-plastic, 2" Granite, pink/gray, dry.		
Boring Terminated @ 5.9' Below Grade							
<div>NOTES: CORE LOG (3 FT CORE) Core (feet) Time (mins) 5.9-6.9 FT 8.13 *Driller opted to terminate boring at 3FT due to obstruction 6.9-7.9 FT 20.35 blocking drill. 7.9-8.9 FT 24.60</div>				<div>LEGEND S - Split Spoon Sample O/A - Sample Collected Off the Augers UT - Undisturbed Tube Sample Trace - Approximately 0 to 10% Some - Approximately 20 to 35% Little - Approximately 10 to 20% And - Approximately 35 to 50% 0-10 Coarse Soil N Value - Loose 30-50 Coarse Soil N Value - Dense 10-30 Coarse Soil N Value - Medium Dense >50 Coarse Soil N Value - Very Dense 0-4 Fine Soil N Value - Soft 8-15 Fine Soil N V:il N Value - Hard 4-8 Fine Soil N Value - Medium Stiff 15-30 Fine Soil N Value - Very Stiff</div>			
ENVIRONMENTAL PARTNERS							
Page 1 of 1							

BORING LOG					B-9
<div>Project: Weymouth LCI</div> <div>Location: Weymouth, MA</div> <div>Client: Town of Weymouth</div> <div>Driller: New England Boring Contractors</div> <div>Drilling Methods: ATV Drill Rig, hollow stem augers or drive and wash methods continuous soil sampling (2FT split spoons)</div> <div>Weather: Warm with clear skies</div> <div>Performed SMB</div> <div>Date: 9/28/2023</div>				See Boring Plan	<div>Description: EP conducted a geotechnical investigation along the sewer alignment consisting of up to ten (10) soil borings. Borings were to be drilled to a proposed depth of 10 FT below the pipe invert or refusal. The borings were advanced using hollow stem augers/drive and wash methods depending on the underlying soil conditions and the groundwater levels. The SPT was recorded at each sampling interval accordance with ASTM D1586. EP logged the borings and performed a visual soil classification in accordance with ASTM D2488.</div> <div>Project No. R290-2101.00</div>
Depth (feet)	Sample No.	SPT	Recovery (in)	Soil Description	Notes
0-2	S-1	1-1-2-4	11/24	9" Loose, dark brown, fine sand, some organics, few gravel, dry, non-plastic*, 2" Dense, brown, fine silty sand, dry, non-plastic.	*Top Soil
2-4	S-2	9-13-50-5 Refusal	12/24	12" Dense, brown, fine silty sand, some coarse grain deposits and poorly sorted gravel, dry, non-plastic.	
Boring Terminated @ 3.1' Below Grade					
<u>NOTES:</u>				<u>LEGEND</u>	
				S - Split Spoon Sample	O/A - Sample Collected Off the Augers
				UT - Undisturbed Tube Sample	
				Trace - Approximately 0 to 10%	Some - Approximately 20 to 35%
				Little - Approximately 10 to 20%	And - Approximately 35 to 50%
				0-10 Coarse Soil N Value - Loose	30-50 Coarse Soil N Value - Dense
				10-30 Coarse Soil N Value - Medium Dense	>50 Coarse Soil N Value - Very Dense
				0-4 Fine Soil N Value - Soft	8-15 Fine Soil N Vail N Value - Hard
				4-8 Fine Soil N Value - Medium Stiff	15-30 Fine Soil N Value - Very Stiff
ENVIRONMENTAL PARTNERS					Page 1 of 1

BORING INFORMATION

NORTHING (ft): 2,909,472
GROUND SURFACE EL. (ft): 14.6
VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
TOTAL DEPTH (ft): 0.7
LOGGED BY: A. Maupin

EASTING (ft): 804,916
DATE START/END: 5/1/2024 - 5/1/2024
DRILLING COMPANY: New England Boring Contractors
DRILLER NAME: Zack Ohman
RIG TYPE: Diedrich D-50

BORING**B-2**

PAGE 1 of 1

DRILLING INFORMATION

HAMMER TYPE: Automatic CASING I.D./O.D.: NA/NA CORE BARREL TYPE: Not used
AUGER I.D./O.D.: NA/NA DRILL ROD O.D.: 2.63 inch CORE BARREL I.D./O.D.: NA/NA
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS: Pen. = Penetration Length S = Split Spoon Sample Qp = Pocket Penetrometer Strength NA, NM = Not Applicable, Not Measured
Rec. = Recovery Length C = Core Sample Sv = Pocket Torvane Shear Strength Blows per 6 in.: 140-lb hammer falling
RQD = Rock Quality Designation U = Undisturbed Sample LL = Liquid Limit 30 inches to drive a 2-inch-O.D.
= Length of Sound Cores > 4 in / Pen., % SC = Sonic Core PI = Plasticity Index split spoon sampler.
WOR = Weight of Rods DP = Direct Push Sample PID = Photoionization Detector
WOH = Weight of Hammer HSA = Hollow-Stem Auger I.D./O.D. = Inside Diameter/Outside Diameter

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
		X S1	0 to 0.7	8/6	2-100/2"	Spoon refusal on concrete S1	TOPSOIL	S1: SANDY SILT (ML); ~70% non-plastic fines; ~30% fine to coarse sand; dark brown; moist; roots. S1 (tip): Concrete fragments. Boring terminated at 8 in below ground surface. Hole was backfilled with cuttings. Borehole was offset 6 ft Northwest.

NOTES: Ground surface estimated from survey plan.**PROJECT NAME:** Weymouth Sewer RR Crossing**CITY/STATE:** Weymouth, MA**GEI PROJECT NUMBER:** 2403908

BORING INFORMATION

NORTHING (ft): 2,909,474
 GROUND SURFACE EL. (ft): 14.5
 VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
 TOTAL DEPTH (ft): 27.0
 LOGGED BY: A. Maupin

EASTING (ft): 804,910
 DATE START/END: 5/1/2024 - 5/1/2024
 DRILLING COMPANY: New England Boring Contractors
 DRILLER NAME: Zack Ohman
 RIG TYPE: Diedrich D-50

BORING
B-2A (OW)

PAGE 1 of 2

DRILLING INFORMATION

HAMMER TYPE: Automatic CASING I.D./O.D.: 5 inch/ 5.5 inch CORE BARREL TYPE: NX Double Tube
 AUGER I.D./O.D.: NA / NA DRILL ROD O.D.: 2.63 inch CORE BARREL I.D./O.D.: 2.15 inch / 2.5 inch
 DRILLING METHOD: Driven casing and washed with rotary tooling.
 WATER LEVEL DEPTHS (ft): 3.2 5/2/2024

ABBREVIATIONS: Pen. = Penetration Length S = Split Spoon Sample Qp = Pocket Penetrometer Strength NA, NM = Not Applicable, Not Measured
 Rec. = Recovery Length C = Core Sample Sv = Pocket Torvane Shear Strength Blows per 6 in.: 140-lb hammer falling
 RQD = Rock Quality Designation U = Undisturbed Sample LL = Liquid Limit 30 inches to drive a 2-inch-O.D.
 = Length of Sound Cores > 4 in / Pen., % SC = Sonic Core PI = Plasticity Index split spoon sampler.
 WOR = Weight of Rods DP = Direct Push Sample PID = Photoionization Detector
 WOH = Weight of Hammer HSA = Hollow-Stem Auger I.D./O.D. = Inside Diameter/Outside Diameter

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
10 <								

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908



Groundwater Well Installation Log				B-2A(OW)	
Project		Weymouth Sewer - Railroad Crossing		GEI Proj. No. 2403908	
City / Town		Weymouth, Massachusetts		Location Trefton Avenue	
Client		Environmental Partners Group		N	
Contractor		New England Boring		E	
Driller		Zack Ohman		Install Date	
		GEI Rep. Anna Maupin		Weds. 5/1/24	
<div><div><div><div><div><div>Survey</div><div>Datum: Town of Weymouth Datum</div></div><div><div>Ground Elevation: Approx. 14.5</div></div></div><div><div><div>2 ft</div><div>Organics</div><div>6 ft</div><div>Clayey Gravel</div><div>8 ft</div><div>Weathered/ Soft Rock and Bedrock</div></div><div>General Soil Conditions (Not to Scale)</div></div><div><div><div>Length of Stand Pipe above Ground</div><div>4.2 ft</div></div><div><div>Top of Riser Pipe to Ground</div><div>3.7 ft</div></div><div><div>Type and Thickness of Seal around Stand Pipe</div><div>6 in. cement</div></div><div><div>ID of Stand Pipe</div><div>4.5 in</div></div><div><div>Type of Surface Casing</div><div>Stand Pipe with Lock</div></div><div><div>Depth Bottom of Surface Casing</div><div>1 ft</div></div><div><div>ID and OD of Riser Pipe</div><div>2 in. ID / 2.4 in. OD</div></div><div><div>Type of Riser Pipe</div><div>Sch. 40 PVC</div></div><div><div>Type of Backfill around Riser Pipe</div><div>soil cuttings</div></div><div><div>Diameter of Borehole</div><div>4.5 in.</div></div><div><div>Depth Top of Seal</div><div>3 ft</div></div><div><div>Type of Seal</div><div>bentonite chips</div></div><div><div>Depth Bottom of Seal</div><div>5 ft</div></div><div><div>Depth Top of Screened Section</div><div>10 ft</div></div><div><div>Type of Screen</div><div>Sch. 40 PVC</div></div><div><div>Description of Screen Openings</div><div>0.020 in. slots</div></div><div><div>ID and OD of Screened Section</div><div>2 in. ID / 2.4 in. OD</div></div><div><div>Type of Filter Material</div><div>med. to coarse sand</div></div><div><div>Depth Bottom of Screened Section</div><div>20 ft</div></div><div><div>Depth Bottom of Silt Trap</div><div>20.3 ft</div></div><div><div>Depth Bottom of Filter Material</div><div>21 ft</div></div><div><div>Depth Top of Seal</div><div>21 ft</div></div><div><div>Type of Seal</div><div>bentonite chips</div></div><div><div>Depth Bottom of Seal</div><div>22.5 ft</div></div><div><div>Type of Backfill below Filter Material</div><div>N.A.</div></div><div><div>Bottom of Borehole</div><div>27 ft</div></div></div></div></div></div> <div><div><div><div>6/3/2024</div><div>0900 hrs</div><div>6.0 ft</div></div><div><div>5/1/2024</div><div>1530 hrs</div><div>6.1 ft</div></div><div><div>Date</div><div>Time</div><div>Distance to ▼ below top of riser pipe</div></div></div></div> <div><div>Notes: Ground elevation based on contour plan provided by Environmental Partners Group. Boring coordinates provided by Green International based on NAD83.</div><div><div>GEI</div><div>Consultants</div></div></div>					

BORING INFORMATION

NORTHING (ft): 2,909,424
 GROUND SURFACE EL. (ft): 34.2
 VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
 TOTAL DEPTH (ft): 50.0
 LOGGED BY: A. Maupin

EASTING (ft): 804,919
 DATE START/END: 4/29/2024 - 4/30/2024
 DRILLING COMPANY: New England Boring Contractors
 DRILLER NAME: Zack Ohman
 RIG TYPE: Diedrich D-50

BORING**B-3**

PAGE 1 of 3

DRILLING INFORMATION

HAMMER TYPE: Automatic CASING I.D./O.D.: 5 inch/ 5.5 inch CORE BARREL TYPE: NX Double Tube
 AUGER I.D./O.D.: NA / NA DRILL ROD O.D.: 2.63 inch CORE BARREL I.D./O.D.: 2.15 inch / 2.5 inch
 DRILLING METHOD: Driven casing and washed with rotary tooling.
 WATER LEVEL DEPTHS (ft): 15.6 4/30/2024

ABBREVIATIONS: Pen. = Penetration Length S = Split Spoon Sample Qp = Pocket Penetrometer Strength NA, NM = Not Applicable, Not Measured
 Rec. = Recovery Length C = Core Sample Sv = Pocket Torvane Shear Strength Blows per 6 in.: 140-lb hammer falling
 RQD = Rock Quality Designation U = Undisturbed Sample LL = Liquid Limit 30 inches to drive a 2-inch-O.D.
 = Length of Sound Cores > 4 in / Pen., % PI = Plasticity Index split spoon sampler.
 WOR = Weight of Rods DP = Direct Push Sample PID = Photoionization Detector
 WOH = Weight of Hammer HSA = Hollow-Stem Auger I.D./O.D. = Inside Diameter/Outside Diameter

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
		S1	0 to 2	24/14	10-9-8-8			S1 (0-4"): NARROWLY GRADED SAND (SP); ~85% fine to medium sand; ~10% fine to coarse gravel; ~5% non-plastic fines; dark brown with gray gravel; dry. S1 (4"-14"): NARROWLY GRADED SAND (SP); ~90% fine to medium sand; ~10% fine to coarse gravel; light brown to tan; dry.
30	5	S2	4 to 6	24/8	6-6-8-5			S2 (0-1"): Similar to S1(4"-14"); except moist. S2 (1"-8"): CLAYEY GRAVEL WITH SAND (GC); ~65% fine to coarse gravel; ~25% low-plasticity fines; ~10% fine to coarse sand; blue gray; moist; weathered rock.
						Rig chatter ~7 ft.		
10		S3	9 to 11	24/8	10-2-4-3			S3: Similar to S2.
						Gray rock cuttings in drill return at 12 ft.		
20	15	S4	14 to 16	24/7	4-4-3-3			S4: CLAYEY SAND WITH GRAVEL (SC); ~40% fine to coarse sand; ~30% fine to coarse gravel; ~30% low-plasticity fines; tan and gray; moist; indications of weathered rock.
		S5	16 to 18	24/0	5-4-3-3			S5 (tip): Similar to S4; except wet.
		S6	18 to 20	24/6	4-3-3-3			S6: CLAYEY SAND WITH GRAVEL (SC); ~65% fine to coarse sand; ~20% low-plasticity fines; ~15% fine to coarse gravel; tan with gray gravel; moist; gravel sized particles contained weathered rock fragments.
						Rig chatter ~17 ft.		

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908

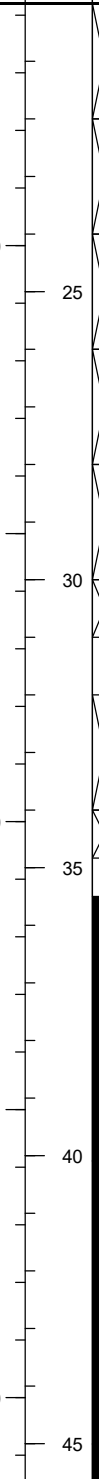


NORTHING (ft): 2,909,424
GROUND SURFACE EL. (ft): 34.2
VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83

EASTING (ft): 804,919
DATE START/END: 4/29/2024 - 4/30/2024
DRILLING COMPANY: New England Boring Contractors

**BORING
B-3**

PAGE 2 of 3

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
10 25 30 35 40 45		S7	20 to 22	24/8	4-3-4-4	5" casing to 20ft, telescope with 4" casing thereafter. Harder drilling at 35 ft. C1 core times: 3.5, 4, 5.5, 4.5 min/ ft, 3 min/ 7" C2 core times: 5, 4, 4.5, 5 min/ ft, 4 min/ 11" C3: Similar to C1.	FILL	S7: CLAYEY SAND WITH GRAVEL (SC); 51.1% fine to coarse sand; 24.8% low-plasticity fines; 24.1% fine gravel; tan with gray gravel; moist; grain size test performed.
		S8	22 to 24	24/11	5-4-2-2			S8 (0-11"): CLAYEY SAND WITH GRAVEL (SC); 41.5% fine to coarse sand; 41.2% fine to coarse gravel; 17.3% low-plasticity fines; tan and gray; moist; shale-like weathered rock throughout; grain size test performed.
		S9	24 to 26	24/24	1-2-2-2		ORGANICS	S8 (tip): SANDY ORGANIC SOIL (OL); ~65% low-plasticity fines; ~30% fine to coarse sand; ~5% fine to coarse gravel; dark brown; moist; organic fibers throughout. S9: ORGANIC SOIL WITH SAND (OL); ~85% low-plasticity fines; ~10% fine to coarse sand; ~5% fine to coarse gravel; dark brown; moist; organic fibers throughout; slight organic odor.
		S10	26 to 28	24/15	3-8-23-39			S10 (0-6"): CLAYEY SAND WITH GRAVEL (SC); ~70% fine to medium sand; ~15% fine to coarse gravel; ~15% low-plasticity fines; grayish brown; wet; some fibrous material. S10 (6"-15"): CLAYEY GRAVEL (GC); ~40% fine to coarse gravel; ~40% low-plasticity fines; ~20% fine to coarse sand; grayish brown with tan and orange; wet; weathered rock decomposed into soil; gravel crushable into a clayey sand.
		S11	28 to 30	24/10	10-34-41-42		TILL	S11 (0-3"): LEAN CLAY WITH SAND (CL); ~80% low plasticity fines; ~10% fine to coarse sand; ~10% fine to coarse gravel; grayish brown; moist; some organic fibers.
		S12	30 to 31	12/8	13-65-100/0"			S11 (3"-10"): CLAYEY SAND WITH GRAVEL (SC); ~50% fine to coarse sand; ~30% fine to coarse gravel; ~20% low-plasticity fines; gray, tan, and orange; moist to dry; decomposed rock. S12: Similar to S11 (3"-10"), except with some weathered rock fragments.
		S13	32 to 34	24/15	56-46-36-31			S13: Similar to S11 (3"-10").
		S14	34 to 34.8	10/10	14-100/4"			S14 (0-3"): SANDY LEAN CLAY WITH GRAVEL (CL); ~50% low-plasticity fines; ~35% fine to coarse sand; ~15% fine to coarse gravel; grayish brown with tan and dark gray; wet. S14 (3"-10"): CLAYEY GRAVEL WITH SAND (GC); ~35% fine to coarse sand; ~35% low-plasticity fines; ~30% fine to coarse gravel; gray, tan, and orange; wet; decomposed rock into soil. S14 (tip): WIDELY GRADED GRAVEL WITH CLAY (GW-GC); ~80% fine to coarse gravel; ~10% low-plasticity fines; ~10% fine to coarse sand; orange and dark gray; moist; weathered rock; friable gravel easily crushed into fine sand and clay.
		C1	35.5 to 40.1	55/55	78		WEATHERED ROCK	C1: ARGILLITE; hard to medium hard, dark gray, fine grained, fresh to slightly weathered argillite with joints spacing from 3" - 10" dipping 45 to 90 degrees; frequent joints along near-vertical bedding planes, occasional iron stained joints.
		C2	40.1 to 45	59/56	79			C2: Similar to C1.
		C3	45 to 50	60/60	90			
							BEDROCK	

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908



EASTING (ft): 804,919

DATE START/END: 4/29/2024 - 4/30/2024

DRILLING COMPANY: New England Boring Contractors

PAGE 3 of 3

CITY/STATE: Weymouth, MA
GEI PROJECT NUMBER: 2403908



GEIWOBURN STD 5-NORTH-EAST-LAYER NAME B2A, B3, B4 TYPED LOGS.GPJ 8/22/24

BORING INFORMATION

NORTHING (ft): 2,909,345
GROUND SURFACE EL. (ft): 13.1
VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
TOTAL DEPTH (ft): 25.5
LOGGED BY: A. Maupin

EASTING (ft): 804,931
DATE START/END: 5/2/2024 - 5/2/2024
DRILLING COMPANY: New England Boring Contractors
DRILLER NAME: Zack Ohman
RIG TYPE: Diedrich D-50

BORING**B-4 (OW)**

PAGE 1 of 2

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Double Tube
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.63 inch **CORE BARREL I.D./O.D.:** 2.15 inch / 2.5 inch
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): 1.5 5/3/2024

ABBREVIATIONS: Pen. = Penetration Length
 Rec. = Recovery Length
 RQD = Rock Quality Designation
 = Length of Sound Cores > 4 in / Pen., %
 WOR = Weight of Rods
 WOH = Weight of Hammer
 S = Split Spoon Sample
 C = Core Sample
 U = Undisturbed Sample
 SC = Sonic Core
 DP = Direct Push Sample
 HSA = Hollow-Stem Auger
 Qp = Pocket Penetrometer Strength
 Sv = Pocket Torvane Shear Strength
 LL = Liquid Limit
 PI = Plasticity Index
 PID = Photoionization Detector
 I.D./O.D. = Inside Diameter/Outside Diameter
 NA, NM = Not Applicable, Not Measured
 Blows per 6 in.: 140-lb hammer falling
 30 inches to drive a 2-inch-O.D.
 split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
		S1	0 to 2	24/0	WOH/18"-1		TOPSOIL	S1 (tip): WIDELY GRADED GRAVEL (GW); ~90% fine to coarse gravel; ~5% non-plastic fines; ~5% fine to coarse sand; gray; wet.
		S2	2 to 4	24/11	WOH-1-3-2		POSSIBLE FILL	S2 (0-5"): ORGANIC SOIL WITH GRAVEL (ML); ~60% low-plasticity fines; ~25% fine to coarse sand; ~15% fine to coarse gravel; dark brown; moist; some roots.
		S3	4 to 6	24/15	6-12-9-8			S2 (5"-11"): SILTY SAND WITH GRAVEL (SM); ~45% fine to coarse sand; ~30% non-plastic fines; ~25% fine to coarse gravel; brown to tan; moist; possible fill.
		S4	6 to 8	24/12	7-7-8-12		TILL	S3: CLAYEY SAND WITH GRAVEL (SC); 51.5% fine to coarse sand; 27.5% low-plasticity fines; 21% fine gravel; brown to tan; wet; grain size test performed.
		S5	8 to 10	24/8	17-12-6-12			S4: CLAYEY SAND WITH GRAVEL (SC); 54.4% fine to coarse sand; 30.2% low-plasticity fines; 15.4% fine gravel; brown to tan; wet; grain size test performed.
		S6	10 to 12	24/13	12-9-10-19			S5: CLAYEY SAND WITH GRAVEL (SC); ~40% fine to coarse sand; ~30% fine to coarse gravel; ~30% low-plasticity fines; brown to tan with gray gravel; wet; gravel is weathered rock.
		S7	12 to 13	12/11	23-100/6"		W.R.	S6: CLAYEY GRAVEL WITH SAND (GC); ~35% fine to coarse gravel; ~35% low-plasticity fines; ~30% fine to coarse sand; brownish gray and tan; moist; weathered rock.
		S8	13.5 to 13.7	2/0	100/2"	Casing refusal at 13.5 ft.		S7 (0-5"): SANDY LEAN CLAY (CL); ~50% low plasticity fines; ~35% fine sand; ~15% fine gravel; brown to tan with gray gravel; wet.
		C1	13.7 to 14 to 19	60/35	32		BEDROCK	S7 (5"-11") CLAYEY GRAVEL (GC); ~60% fine to coarse gravel; ~30% low-plasticity fines; ~10% fine to coarse sand; brownish gray with dark gray gravel; wet; weathered rock; heavily weathered to decomposed rock.
		C2	19 to	60/25	20	C1 core times: 1.5, 2, 3, 5.5, 5 min/ ft Fall in occurring when attempting to ream out hole to 19 ft after taking C1. Drove 4" casing to 18 ft.		S8: No recovery C1: ARGILLITE; soft to hard, dark gray, slightly weathered argillite with fresh to moderately weathered joints spaced from 2"-8" dipping 30 to 80 degrees. Severely weathered from 0-5". C2: ARGILLITE; soft to hard, dark gray, slightly weathered argillite with fresh to slightly weathered joints spaced from 2"-8"

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908



NORTHING (ft): 2,909,345
GROUND SURFACE EL. (ft): 13.1
VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83

EASTING (ft): 804,931
DATE START/END: 5/2/2024 - 5/2/2024
DRILLING COMPANY: New England Boring Contractors

BORING
B-4 (OW)
PAGE 2 of 2

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
			24			C2 core times: 4, 4, 4, 4.5, 8 min/ ft	BEDROCK	dipping 30 to 80 degrees.
	25							
						Hole reamed to 25.5 ft after C2 was completed. Hole was flushed until the water return was clear.		Boring terminated at 25.5 ft. Installed observation well upon completion.
	30							
	35							
	40							
	45							

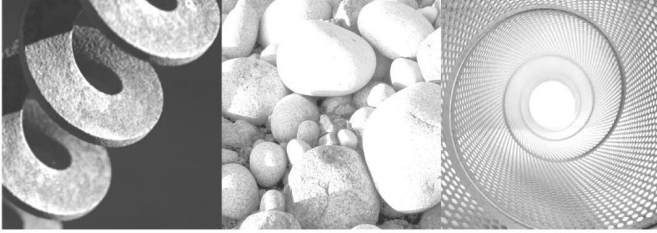
NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA
GEI PROJECT NUMBER: 2403908



Groundwater Well Installation Log				B-4(OW)	
Project		Weymouth Sewer - Railroad Crossing		GEI Proj. No. 2403908	
City / Town		Weymouth, Massachusetts		Location See Plan	
Client		Environmental Partners Group			
Contractor		New England Boring			
Driller		Zack Ohman		GEI Rep. Anna Maupin	
Install Date		Thurs. 5/2/24			
<div><div><div><div><div><div>Survey</div><div>Datum: Town of Weymouth Datum</div><div>Ground Elevation: Approx. 13.1</div></div><div><div>6/3/2024</div><div>0840 hrs</div><div>3.7 ft</div></div><div><div>5/3/2024</div><div>0930 hrs</div><div>5.2 ft</div></div><div><div>Date</div><div>Time</div><div>Distance to ▼ below top of riser pipe</div></div></div><div><div>General Soil Conditions (Not to Scale)</div><div><div>Topsoil / Fill</div><div>4 ft</div><div>Glacial Till</div><div>12.5 ft</div><div>Weathered/ Soft Rock and Bedrock</div></div></div></div><div><div>Length of Stand Pipe above Ground</div><div>4.4 ft</div><div>Top of Riser Pipe to Ground</div><div>3.7 ft</div><div>Type and Thickness of Seal around Stand Pipe</div><div>6 in. cement</div><div>ID of Stand Pipe</div><div>4.5 in</div><div>Type of Surface Casing</div><div>Stand Pipe with Lock</div><div>Depth Bottom of Surface Casing</div><div>1 ft</div><div>ID and OD of Riser Pipe</div><div>2 in. ID / 2.4 in. OD</div><div>Type of Riser Pipe</div><div>Sch. 40 PVC</div><div>Type of Backfill around Riser Pipe</div><div>med. to coarse sand</div><div>Diameter of Borehole</div><div>4.5 in.</div><div>Depth Top of Seal</div><div>8.5 ft</div><div>Type of Seal</div><div>bentonite chips</div><div>Depth Bottom of Seal</div><div>11.5 ft</div><div>Depth Top of Screened Section</div><div>15.5</div><div>Type of Screen</div><div>Sch. 40 PVC</div><div>Description of Screen Openings</div><div>0.020 in. slots</div><div>ID and OD of Screened Section</div><div>2 in. ID / 2.4 in. OD</div><div>Type of Filter Material</div><div>med. to coarse sand</div><div>Depth Bottom of Screened Section</div><div>25.2</div><div>Depth Bottom of Silt Trap</div><div>25.5</div><div>Depth Bottom of Filter Material</div><div>25.5 ft</div><div>Depth Top of Seal</div><div>N.A.</div><div>Type of Seal</div><div>N.A.</div><div>Depth Bottom of Seal</div><div>N.A.</div><div>Type of Backfill below Filter Material</div><div>N.A.</div><div>Bottom of Borehole</div><div>25.5 ft</div></div></div></div> <div><div>Notes:</div><div>Ground elevation based on contour plan provided by Environmental Partners Group. Boring coordinates provided by Green International based on NAD83.</div></div> <div><div>GEI</div><div>Consultants</div></div>					



Geotechnical Report

Weymouth Sewer Line Railroad Crossing

Weymouth, Massachusetts

Submitted to:

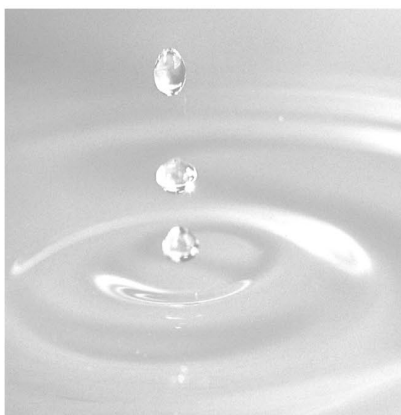
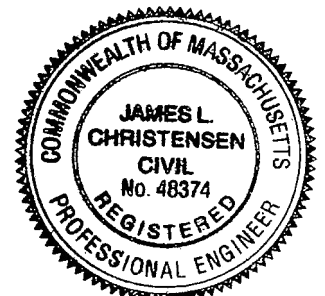
Environmental Partners Group, LLC.
1900 Crown Colony Drive, Suite 402
Quincy, MA 02169

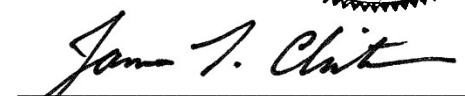
Submitted by:

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801
781.721.4000

August 2024

Project No. 2403908




James Christensen, P.E.
Project Manager



Michael Paster, P.E.
Senior Technical Reviewer

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Figure 1. Site Location Map

Figure 2. Exploration Location Plan

Figure 3. Subsurface Profile A - A'

Appendices

Appendix A Boring and Well Logs

Appendix B Laboratory Test Data

Executive Summary

This report presents the results of subsurface explorations, our evaluation of the existing subsurface conditions, and our geotechnical recommendations for the installation of a 42-inch sewer line passing under the MBTA commuter rail in Weymouth, Massachusetts.

E.S.1. Subsurface Conditions

Three borings were performed to explore subsurface conditions. The borings generally encountered topsoil followed by a 1.6-foot-thick fill layer, except in the embankment where the fill was around 23 feet thick. Organic soil was encountered below the fill layer, with thicknesses ranging from 3 to 4 feet, followed by 2- to 8.4-foot-thick layer of glacial till. Bedrock was encountered at elevations between El. 1.5 to El. -1.3 across the borings. The bedrock consisted of dark gray argillite. Groundwater levels in the observation wells ranged from elevations El. 12.2 to El. 13.1.

E.S.2. Geotechnical Recommendations

For the installation of the proposed casing pipe, a minimum of 1-inch-thick steel casing is recommended based on the MBTA Railroad Operations Directorate. Casing pipe should be fitted with threaded ports to allow pumping bentonite slurry during pipe jacking and grouting outside of the casing pipe upon completion of casing pipe installation. Possible installation methods for the pipe include pipe jacking and microtunneling.

E.S.3. Construction Considerations

Mixed face conditions consisting of fill, organic soil, glacial till, weathered bedrock, and bedrock is anticipated to be encountered along the alignment of the casing pipe.

All the excavations for the proposed pipe should be performed in accordance with OSHA standards. Temporary excavation support systems will be required for the jacking and receiving pits at the railroad crossing and should be designed by a Massachusetts registered professional engineer.

A combination of dewatering wells and filtered sumps should be installed at the jacking and receiving pit locations. For pipe jacking, dewatering along the alignment will be required. Dewatering along the alignment is expected to cause some additional settlement of the embankment due to the presence of the organic soils.

1. Background Information

1.1. Purpose

This report presents the results of subsurface explorations, our evaluation of the existing subsurface conditions, and our geotechnical recommendations for the installation of a 42-inch sewer line passing under the MBTA commuter rail in Weymouth, Massachusetts.

1.2. Scope of Work

We performed the following scope of work:

- Performed three borings to observe soil and rock conditions around the proposed sewer line.
- Performed the following laboratory testing on collected samples:
 - (5) Grain Size Analyses
 - (2) Atterberg Limits
 - (2) Organic Content Tests
 - (2) Water Content Tests
- Developed recommendations for the installation of the proposed 60-inch-diameter casing pipe to accommodate the 42-inch-diameter PVC sewer line.
- Prepared this report presenting the results of our subsurface explorations, the results of our laboratory testing, and our geotechnical recommendations.

1.3. Authorization

Our work was authorized by the “Subconsultant Services Agreement” between GEI Consultants, Inc. and Environmental Partners Group, LLC, dated December 6, 2022.

1.4. Elevation Datum

Elevations in this report are in feet and reference the Town of Weymouth Vertical Datum. El. 0.0 (Town of Weymouth Datum) = El. -6.63 NAVD88.

1.5. Site and Project Description

The Town of Weymouth is proposing to install a new 42-inch-diameter PVC gravity sewer that will cross the MBTA railroad south of Montcalm Street and east of Trefton Avenue. At the proposed location of the sewer crossing, the MBTA railroad is on a raised embankment that generally runs east-west as shown in Fig. 1. The crest of the embankment ranges from about El. 34 to El. 36, which is about 20 to 25 feet higher than the surrounding ground surface. The ground surface elevation north of the embankment ranges from about El. 13 to El. 15, and the ground surface elevation south of the embankment varies

from about El. 12 to El. 15. The property 11 Montcalm St is west of the proposed sewer alignment on the north side of the railroad tracks. The property to the west of the proposed sewer alignment on the south side of the tracks is generally wooded. The area to the east of the proposed sewer generally consists of wetlands and marsh areas also known as the Cadman Conservation Area. The Tide Mill Brook runs under the MBTA railroad east of the proposed sewer alignment and into Mill Cove.

We understand that a 60-inch-diameter steel casing pipe will be jacked below the railroad to accommodate the new sewer. The proposed direction of jacking is from south to north.

2. Subsurface Conditions

2.1. Exploration Program

Environmental Partners Group, Inc. engaged New England Boring, Inc. (NEB) of Taunton, Massachusetts, to drill the borings (B-2, B-2A(OW), B-3, and B-4(OW)) at the proposed sewer crossing between April 29 and May 2, 2024. A GEI field representative was on site full time to coordinate the work and log the borings. Groundwater observation wells were installed in two of the borings, B-2A(OW) and B-4(OW). Boring locations are shown in Fig. 2. Boring logs and well installation logs are provided in Appendix A.

The borings were advanced using driven flush joint casing and wash rotary drilling techniques. Standard Penetration Testing (SPT) with split spoon sampling was generally performed continuously. In B3 samples were taken at 5-foot intervals through the railroad embankment to a depth of 14 feet, and samples were taken continuously thereafter. B-2 encountered refusal at 8 inches below ground surface, so an offset location was drilled (B-2A(OW)). B-2A(OW), B-3, and B-4(OW) were advanced into bedrock using a NX-size double tube core barrel.

2.2. Laboratory Testing

We performed five grain size analyses, two Atterberg limits tests, two organic content tests, and two water content tests on soil samples obtained from the borings. The results of the laboratory tests are presented in Appendix B.

2.3. Subsurface Conditions

The strata encountered in B-2A(OW) through B-4(OW) are described below in order of increasing depth and are shown in the profile in Fig. 3. The descriptions are based on observations made at the locations of the borings. Conditions between borings may differ from those indicated below.

Topsoil: B-2, B-2A(OW) and B-4(OW) were drilled in grassy, wooded areas on either side of the embankment. Topsoil was encountered at the ground surface in these three borings. The layer ranged from about 2 to 2.5-feet-thick in borings B-2A(OW) and B-4(OW), respectively. Topsoil was encountered in B-2A(OW) until refusal at a depth of 8 inches. The topsoil generally consisted of organic soil with gravel, silty sand with gravel, and sandy organic soil. Uncorrected N-values were 0 (weight of hammer) and 6 blows per foot.

Fill: Fill was encountered in B-3 beginning at the ground surface and extended to a depth of about 23 feet (El. 34.2 to El. 11.2), and in B-4(OW) below the topsoil layer from depth of 2.4 to 4 feet (El. 10.7 to El. 9.1). The fill appeared to be a mixture of reworked glacial till, decomposed rock, and weathered rock fragments. The fill generally consisted of narrowly graded sand, clayey gravel with sand, clayey sand with gravel, and silty sand with gravel. The uncorrected N-values ranged from 4 to 17.

Organics: Organic soils were encountered below the topsoil layer in B-2A(OW) from depth 2 to 6 feet (El. 12.5 to El. 8.5) and below the fill layer in B-3 from depth 22.9 to 26 feet (El. 11.3 to El. 8.2). This layer

ranged from about 3 to 4-feet thick. The layer generally consisted of organic silt with varying amounts of sand with gravel and fibrous material throughout. The uncorrected N-values ranged from 0 (weight of hammer) to 4, indicating a very soft to medium soft layer.

Glacial Till: Glacial till was encountered above the weathered rock. The thickness of the glacial till layer varied from about 2-feet in B-2A to 8.4-feet in B-4(OW). The top of the glacial till layer was encountered at El. 8.5, El. 8.2, and El. 9.1 in B-2A(OW), B-3, and B-4(OW), respectively. This layer consisted of silty sand with gravel, clayey sand with gravel, clayey gravel with varying amounts of sand, and lean clay with varying amounts of sand. The samples from this layer contained frequent fragments of weathered rock in the silty or clayey soil matrix. The uncorrected SPT N-values ranged from 10 to 31, indicating a medium dense to dense soil layer.

Weathered Rock: A layer of weathered rock was encountered between the glacial till and bedrock in all three borings. At B-2A(OW), approximately 5 feet of weathered rock was encountered below the glacial till at a depth of 8 feet (El. 6.5). At B-3, approximately 6.5 feet of weathered rock was encountered at depth 28.3 feet (El. 5.9). At B-4(OW), only 1.3 feet of weathered rock was encountered at depth 12.4 feet (El. 0.7). The weathered rock consisted of clayey gravel with varying amounts of sand, widely graded gravel with clay, clayey sand with gravel, and sandy lean clay with varying amounts of gravel. All samples appeared to be moderately to highly weathered or decomposed rock. The uncorrected N-values within the weathered rock ranged from 75 to over 100, indicating a very dense layer.

Bedrock: Bedrock was cored at El. 1.5, El. -1.3, and El. -0.9 in B-2A(OW), B-3, and B-4(OW), respectively. The change from weathered rock to bedrock was transitional. Bedrock may be encountered higher than the elevation where the first core was taken. The bedrock was generally slightly weathered to fresh dark gray argillite with fresh to moderately weathered joints with occasional iron staining. The first core run in B-2A(OW) was slightly to moderately weathered. The bedding generally varied from about 30 degrees to near vertical and joint spacing typically ranged from 2 to 10 inches dipping between 30 and 90 degrees. Rock core recoveries ranged from 42% to 100%. The rock quality designations (RQDs) ranged from 8% to 90% with RQD generally increasing with depth.

2.4. Groundwater

Groundwater encountered at the time of the explorations ranged from depths of 1.5 to 15.6 feet, or El. 18.6 to El. 11.3. We expect that these levels do not necessarily represent stabilized levels since water was used as a drilling fluid. Observation wells were installed at B-2A(OW) and B-4(OW). The water levels at these locations were recorded in a later site visit and are listed in the table below. Significantly different groundwater levels may occur at other times and locations. Based on the proximity to the tidal marsh, we expect that the groundwater levels are tidally influenced. The predicted high tide at the Fore River Bridge in Weymouth on June 3, 2024, was at 9:20 AM, which was less than an hour after the time the water levels were measured.

Observation Well ID	Date	Depth to Ground Water Below Ground Surface (ft)	Groundwater Elevation (TOWD)
B 2A(OW)	6/3/2024	2.3	12.2
B 4(OW)	6/3/2024	0.0	13.1

3. Geotechnical Recommendations

The proposed invert of the casing pipe is at El. 6.8, and the bottom of the casing pipe is at El. 6.71. The proposed crown of the pipe is at El. 11.71. The top of the embankment is at about El. 36 resulting in about 24.3 feet of overburden over the casing at the midpoint of the embankment.

Based on our review of the embankment fill soils at B-3, we recommend assuming an embankment fill unit weight of 125 pcf. We estimate that the vertical stress at the top, springline, and bottom of the casing pipe will be about 3050 psf, 3350 psf, and 3650 psf, respectively. The additional live load from the Cooper E80 surcharge load with impact may be taken as 300 psf based on Section 6.01 of the MBTA Railroad Operations Directorate, Chapter IV, Pipeline Occupancy Specifications.

Based on Plate V from the MBTA Railroad Operations Directorate, Chapter IV, Pipeline Occupancy Specifications, the minimum wall thickness for the steel casing pipe should be 0.876 inch if protected from corrosion and 0.939 inch if unprotected. Therefore, we recommend specifying a minimum 1-inch-thick steel casing pipe.

We recommend that threaded ports be incorporated into the casing pipe to allow pumping bentonite slurry during the bore to reduce jacking forces and then grouting the annular space after the casing pipe is installed. Ports should be located at the crown and 120-degrees apart.

The annular space between the proposed 42-inch sewer and the casing pipe should be grouted. Properly detailed casing spacers will be required to maintain the proposed pitch on the gravity sewer. The annular grouting may need to be performed in multiple stages and the pipe may need to be bulkheaded and filled with water to prevent overstressing the PVC during the grouting. Use of lightweight grout (foam concrete) may be an alternative to a sanded grout or neat cement grout.

Installation of the casing pipe can be performed using either pipe jacking or microtunneling, as described below. The length of casing to be installed by one of these methods is about 110 to 130 feet.

For either method, the contract should include a provision to relevel the railroad tracks at least once during the work and potentially after the work is completed. Real time track monitoring should be performed to notify the contractor, designer, Town, MBTA, and Keolis if settlement or movement occurs.

Pipe Jacking

Pipe jacking with a leading shield is an option to install the casing pipe. For this option, we recommend performing dewatering along the casing alignment. Due to the depth of the jacked pipe, we expect that closely spaced deep wells will be required since the required depth of dewatering is approaching or potentially exceeding the maximum effective depth for wellpoints. Angled wells or wellpoints installed from the sides of the embankment may be feasible. We recommend dewatering the alignment at least two weeks prior to the start of the pipe jacking. We recommend installing observation wells between the dewatering wells to measure the water levels during pipe jacking. We recommend maintaining the groundwater 2 feet below the invert of the pipe during the pipe jacking.

We expect that dewatering may result in some additional settlement of the embankment due to additional consolidation of the clayey soils and the organic layer.

If intact bedrock is encountered, the groundwater will need to be maintained below the invert of the pipe to allow removal of the rock.

Microtunneling

We recommend considering microtunneling for the casing pipe installation. Microtunneling is a closed face, remotely controlled, guided, trenchless process that provides continuous positive control of earth and groundwater pressures at the face of the excavation. This method allows tunneling below the groundwater table with minimal risk of loss of ground stability. The micro-tunneling process does not require routine personnel entry into the tunnel.

Micro-tunneling can be used in different ground conditions varying from soft soils to hard rock with proper selection of the microtunnel boring machine model and tooling. Excavation of soils containing cobbles and boulders can sometime become challenging for microtunneling. To mitigate or counteract this challenge, it is critical to develop a comprehensive microtunneling plan and to select an experienced contractor with the right microtunnel boring machine (MTBM) and tooling that is well suited for the project requirements and ground conditions.

Based on the current alignment, the heading will encounter mixed face conditions consisting of embankment fill, organic soils, glacial till, and weathered rock. Encountering less weathered argillite bedrock is possible. Additionally, the glacial till may also contain cobbles and boulders. The selected MTBM must be able to excavate through cobbles and boulders of similar rock types that were found in the explorations as well as bedrock, glacial till, and mixed face conditions. We recommend a slurry MTBM that can handle a range and combination of medium hard to soft rock, cohesive soils, and granular soils.

The contractor will need to properly assess the required jacking loads to ensure the selected jacking system has sufficient thrust capacity to complete the microtunneling operation and casing pipe installation. As part of the evaluation, the contractor will also need to perform the structural analysis of the casing pipe to determine the minimum required casing pipe thickness.

4. Construction Considerations

4.1. Excavation and Dewatering

All excavations for manholes, jacking and receiving pits, and sewer pipes should be made in accordance with OSHA standards. Temporary excavation support systems will be required for the jacking and receiving pits at the railroad crossing and may be necessary for manholes and for sewer line installation. A Massachusetts registered professional engineer engaged by the contractor should design any required temporary excavation support systems that are not included in the contract documents. The design should be submitted for review before installation.

At the jacking and receiving pit locations, we anticipate that a combination of dewatering wells and filtered sumps will be adequate to control groundwater during construction. Due to the low permeability of the on-site soils, we expect infiltration of dewatering effluent back into the ground will not be effective. Therefore, we expect that the dewatering effluent will need to be treated and discharged back into the resource area. This may require additional permits.

Groundwater levels measured in the borings and observation wells were above the proposed top of the casing pipe. If pipe jacking is used to install the casing pipe, then dewatering along the alignment with closely spaced wellpoints, eductor wells, or deep wells will be required in addition to dewatering at the jacking and receiving pit locations.

4.2. Subgrade Preparation

We recommend preparing the subgrade in the jacking and receiving pits by excavating with a smooth-bladed excavator bucket, then immediately placing a minimum 6-oz/square yard, non-woven geotextile filter fabric and 12 inches of ¾-inch crushed stone. Alternatively, if the contractor requires a concrete slab for their equipment, a concrete working mat may be placed directly over the subgrade immediately after excavating to the final subgrade. Since the subgrade will be well below the static groundwater level, we recommend installing a series of geocomposite drainage strips under the working mat and connecting them to a sump to prevent the buildup of excess water pressure below the concrete working mat.

Bearing surfaces should be free of standing water, frost, and loose soil before placement of crushed stone.

4.3. Freezing Conditions

The soils at the site are frost susceptible. Therefore, if construction is performed during freezing weather, special precautions will be required to prevent the subgrade soils from freezing. Freezing of the soil beneath the sewer or manhole structures during construction may result in subsequent settlement of the pipes or structures.

Soil placed as fill should be free of frost, as should the ground on which it is placed.

4.4. Monitoring

We recommend monitoring the railroad tracks using an Automated Motorized Total Station (AMTS). We recommend establishing a baseline at least two weeks before the start of construction. Deformation Monitoring Points (DMPs) should be installed on the rails using clips and extend at least 100 feet beyond the work area in both directions. DMPs should be spaced at no more than 30-foot spacing along each rail with closer spacing directly above the sewer alignment. DMPs should be monitored hourly when the work is not happening and at 15-minute intervals during pipe jacking or microtunneling. Lateral and vertical movement limits should be reviewed and approved by railroad operations prior to bidding the work. Monitoring should continue for at least two weeks upon completion of the work. If movement trends are observed, monitoring should be continued until it stabilizes.

We recommend installing at least four piezometers in the embankment to measure the groundwater levels prior to and during pipe jacking or tunneling. We recommend installing vibrating wire transducers in the observation wells to monitor the water levels continuously.

5. Future Work and Limitations

We recommend that GEI be engaged during construction to review contractor submittals, provide consultation as requested, and provide occasional site visits.

This report was prepared for Environmental Partners Group, LLC, exclusively. Our recommendations are based on the project information provided to us at the time of this report and may require modification if there are any changes in the nature, design, or location of the proposed construction. We cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations in between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. Therefore, we recommend that GEI be engaged to make site visits during construction to: a) check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and b) ascertain that, in general, the work is being performed in compliance with the contract documents and our recommendations.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, express or implied, is made.

Figures

Figure 1. Site Location Map

Figure 2. Exploration Location Plan

Figure 3. Subsurface Profile A - A'



This Image is from U.S.G.S. Topographic 7.5 Minute Series
Weymouth, MA Quadrangle, 2021.
Datum is North American Vertical Datum of 1988 (NAVD88).
Contour Interval is 10 Feet.



Weymouth Sewer - Railroad Crossing
Weymouth, Massachusetts

Environmental Partners Group
Quincy, Massachusetts

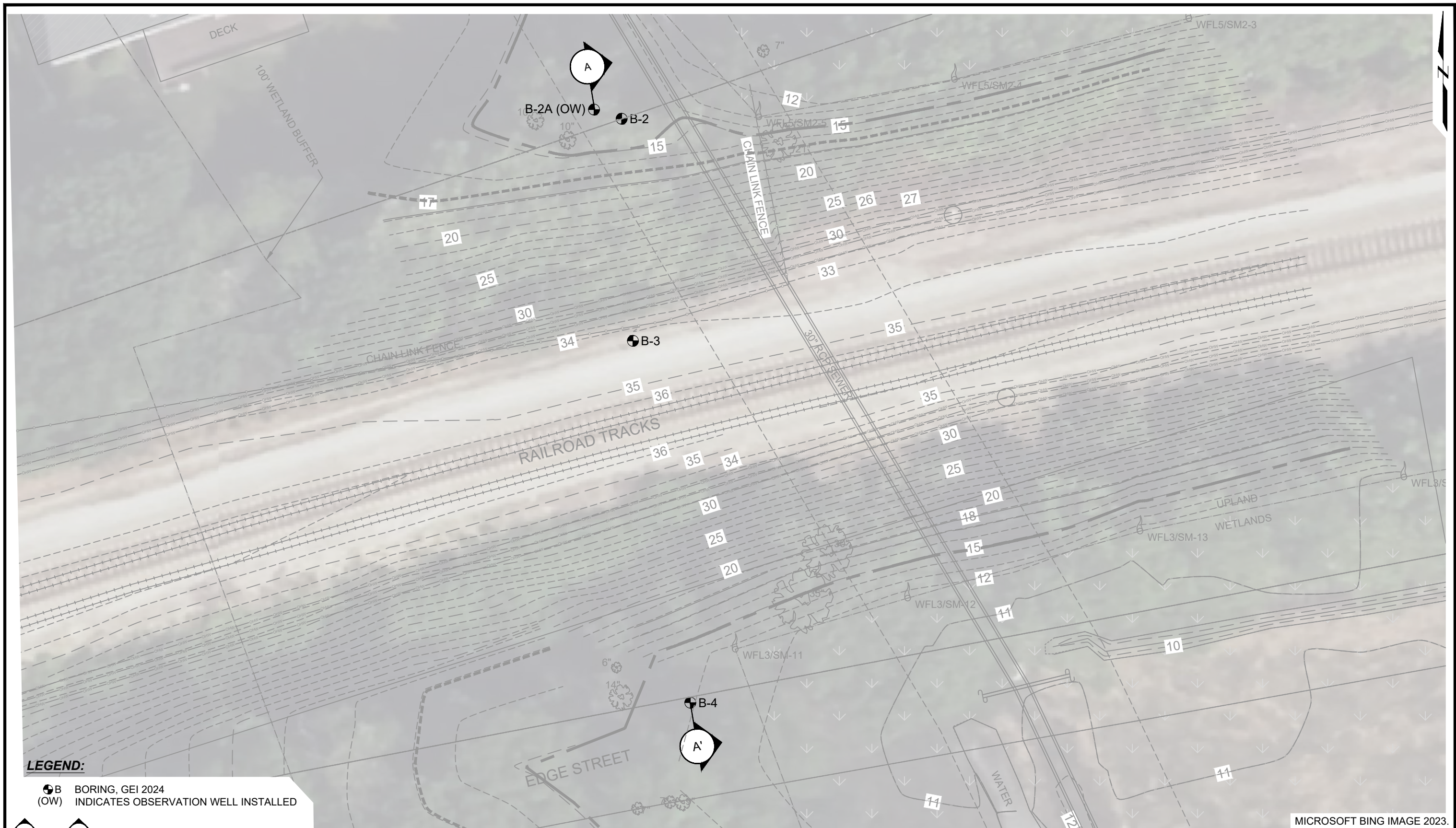


Project 2403908

SITE LOCATION MAP

August 2024

Fig. 1




LEGEND:

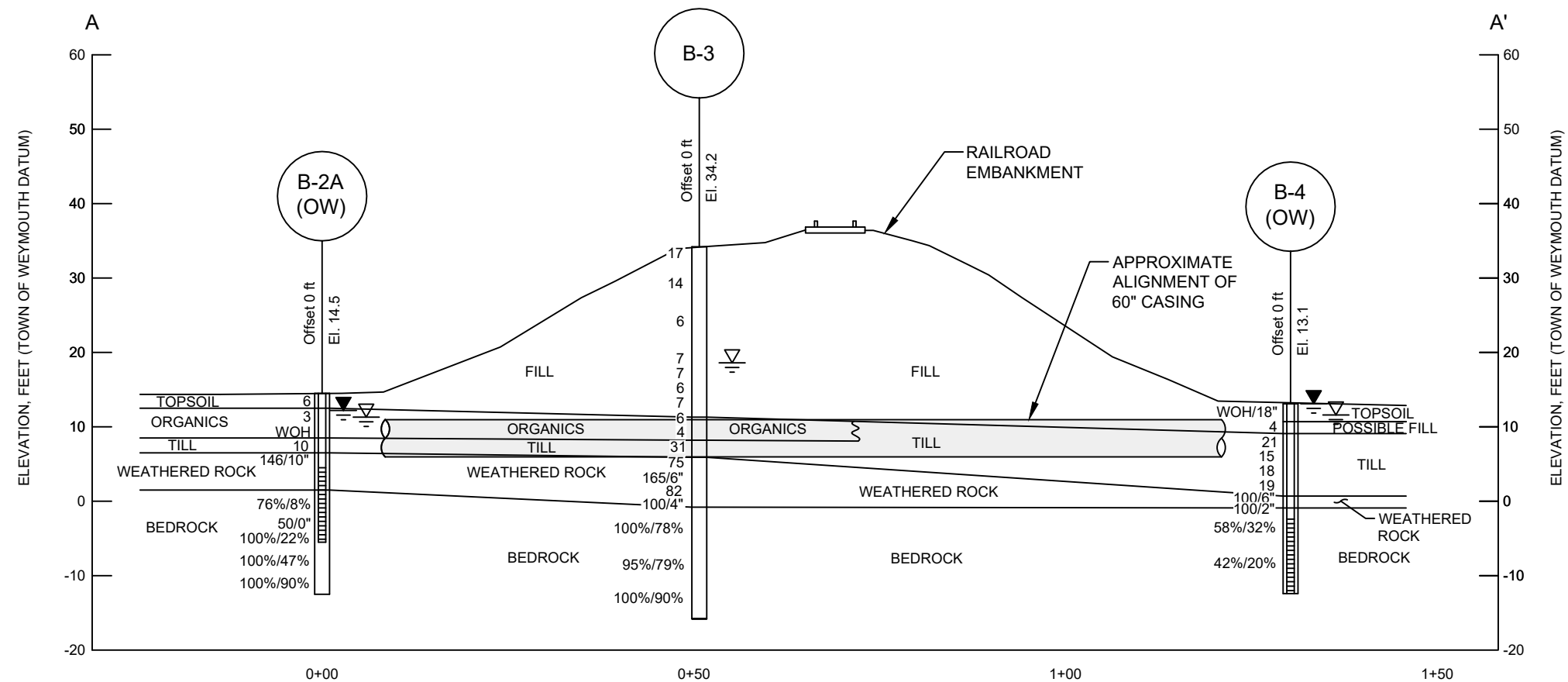
● B BORING, GEI 2024
(OW) INDICATES OBSERVATION WELL INSTALLED

— A — A' — SUBSURFACE PROFILE, SEE FIG. 3

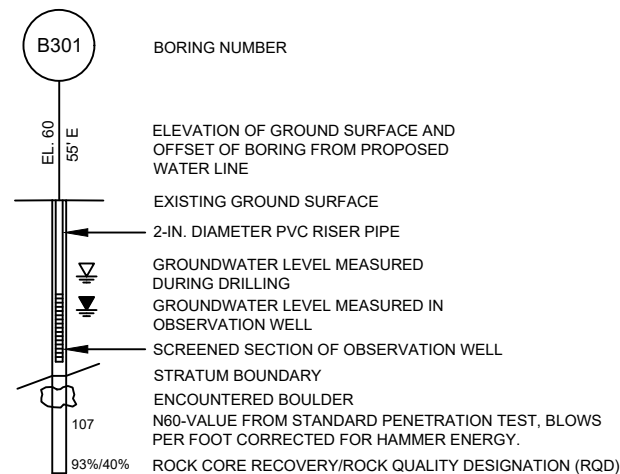
- NOTES:**
- ELEVATIONS ARE BASED ON TOWN OF WEYMOUTH DATUM (TWD). EL. 0.0 TWD = EL. 6.63' NAVD88.
 - BASE PLAN FROM PROVIDED BY ENVIRONMENTAL PARTNERS GROUP ON 5/15/2024.



Weymouth Sewer - Railroad Crossing Weymouth, Massachusetts			EXPLORATION LOCATION PLAN	
Environmental Partners Group, LLC Quincy, Massachusetts			Project 2403908	August 2024
				Fig. 2

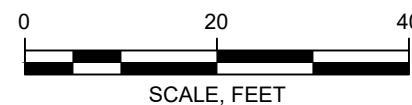


LEGEND:



NOTES:

- ELEVATIONS ARE BASED ON TOWN OF WEYMOUTH DATUM (TWD). EL. 0.00 TWD = 6.63' NAVD88.
- THE SOIL CONDITIONS ARE KNOWN ONLY AT THE BORING LOCATIONS. BOUNDARIES BETWEEN STRATA MAY BE TRANSITIONAL. THE STRATA BOUNDARIES BETWEEN BORINGS MAY VARY SIGNIFICANTLY FROM THE INTERPRETATIONS SHOWN.



Weymouth Sewer - Railroad Crossing
Weymouth, Massachusetts

Environmental Partners Group, LLC
Quincy, Massachusetts



Project 2403908

SUBSURFACE PROFILE A - A'

August 2024

Fig. 3

Appendix A Boring and Well Logs

BORING INFORMATION

NORTHING (ft): 2,909,472
GROUND SURFACE EL. (ft): 14.6
VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
TOTAL DEPTH (ft): 0.7
LOGGED BY: A. Maupin

EASTING (ft): 804,916
DATE START/END: 5/1/2024 - 5/1/2024
DRILLING COMPANY: New England Boring Contractors
DRILLER NAME: Zack Ohman
RIG TYPE: Diedrich D-50

BORING**B-2**

PAGE 1 of 1

DRILLING INFORMATION

HAMMER TYPE: Automatic CASING I.D./O.D.: NA/NA CORE BARREL TYPE: Not used
AUGER I.D./O.D.: NA/NA DRILL ROD O.D.: 2.63 inch CORE BARREL I.D./O.D.: NA/NA
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS: Pen. = Penetration Length S = Split Spoon Sample Qp = Pocket Penetrometer Strength NA, NM = Not Applicable, Not Measured
Rec. = Recovery Length C = Core Sample Sv = Pocket Torvane Shear Strength Blows per 6 in.: 140-lb hammer falling
RQD = Rock Quality Designation U = Undisturbed Sample LL = Liquid Limit 30 inches to drive a 2-inch-O.D.
= Length of Sound Cores > 4 in / Pen., % SC = Sonic Core PI = Plasticity Index split spoon sampler.
WOR = Weight of Rods DP = Direct Push Sample PID = Photoionization Detector
WOH = Weight of Hammer HSA = Hollow-Stem Auger I.D./O.D. = Inside Diameter/Outside Diameter

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
		X S1	0 to 0.7	8/6	2-100/2"	Spoon refusal on concrete S1	TOPSOIL	S1: SANDY SILT (ML); ~70% non-plastic fines; ~30% fine to coarse sand; dark brown; moist; roots. S1 (tip): Concrete fragments. Boring terminated at 8 in below ground surface. Hole was backfilled with cuttings. Borehole was offset 6 ft Northwest.

NOTES: Ground surface estimated from survey plan.**PROJECT NAME:** Weymouth Sewer RR Crossing**CITY/STATE:** Weymouth, MA**GEI PROJECT NUMBER:** 2403908

BORING INFORMATION

NORTHING (ft): 2,909,474
 GROUND SURFACE EL. (ft): 14.5
 VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
 TOTAL DEPTH (ft): 27.0
 LOGGED BY: A. Maupin

EASTING (ft): 804,910
 DATE START/END: 5/1/2024 - 5/1/2024
 DRILLING COMPANY: New England Boring Contractors
 DRILLER NAME: Zack Ohman
 RIG TYPE: Diedrich D-50

BORING
B-2A (OW)

PAGE 1 of 2

DRILLING INFORMATION

HAMMER TYPE: Automatic CASING I.D./O.D.: 5 inch/ 5.5 inch CORE BARREL TYPE: NX Double Tube
 AUGER I.D./O.D.: NA / NA DRILL ROD O.D.: 2.63 inch CORE BARREL I.D./O.D.: 2.15 inch / 2.5 inch
 DRILLING METHOD: Driven casing and washed with rotary tooling.
 WATER LEVEL DEPTHS (ft): 3.2 5/2/2024

ABBREVIATIONS: Pen. = Penetration Length S = Split Spoon Sample Qp = Pocket Penetrometer Strength NA, NM = Not Applicable, Not Measured
 Rec. = Recovery Length C = Core Sample Sv = Pocket Torvane Shear Strength Blows per 6 in.: 140-lb hammer falling
 RQD = Rock Quality Designation U = Undisturbed Sample LL = Liquid Limit 30 inches to drive a 2-inch-O.D.
 = Length of Sound Cores > 4 in / Pen., % SC = Sonic Core PI = Plasticity Index split spoon sampler.
 WOR = Weight of Rods DP = Direct Push Sample PID = Photoionization Detector
 WOH = Weight of Hammer HSA = Hollow-Stem Auger I.D./O.D. = Inside Diameter/Outside Diameter

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
10 								

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908



Groundwater Well Installation Log				B-2A(OW)	
Project		Weymouth Sewer - Railroad Crossing		GEI Proj. No. 2403908	
City / Town		Weymouth, Massachusetts		Location Trefton Avenue	
Client		Environmental Partners Group		N	
Contractor		New England Boring		E	
Driller		Zack Ohman		Install Date	
		GEI Rep. Anna Maupin		Weds. 5/1/24	
<div><div><div><div><div><div>Survey</div><div>Datum: Town of Weymouth Datum</div></div><div><div>Ground Elevation: Approx. 14.5</div></div></div><div><div><div>2 ft</div><div>Organics</div><div>6 ft</div><div>Clayey Gravel</div><div>8 ft</div><div>Weathered/ Soft Rock and Bedrock</div></div><div>General Soil Conditions (Not to Scale)</div></div><div><div><div>Length of Stand Pipe above Ground</div><div>4.2 ft</div></div><div><div>Top of Riser Pipe to Ground</div><div>3.7 ft</div></div><div><div>Type and Thickness of Seal around Stand Pipe</div><div>6 in. cement</div></div><div><div>ID of Stand Pipe</div><div>4.5 in</div></div><div><div>Type of Surface Casing</div><div>Stand Pipe with Lock</div></div><div><div>Depth Bottom of Surface Casing</div><div>1 ft</div></div><div><div>ID and OD of Riser Pipe</div><div>2 in. ID / 2.4 in. OD</div></div><div><div>Type of Riser Pipe</div><div>Sch. 40 PVC</div></div><div><div>Type of Backfill around Riser Pipe</div><div>soil cuttings</div></div><div><div>Diameter of Borehole</div><div>4.5 in.</div></div><div><div>Depth Top of Seal</div><div>3 ft</div></div><div><div>Type of Seal</div><div>bentonite chips</div></div><div><div>Depth Bottom of Seal</div><div>5 ft</div></div><div><div>Depth Top of Screened Section</div><div>10 ft</div></div><div><div>Type of Screen</div><div>Sch. 40 PVC</div></div><div><div>Description of Screen Openings</div><div>0.020 in. slots</div></div><div><div>ID and OD of Screened Section</div><div>2 in. ID / 2.4 in. OD</div></div><div><div>Type of Filter Material</div><div>med. to coarse sand</div></div><div><div>Depth Bottom of Screened Section</div><div>20 ft</div></div><div><div>Depth Bottom of Silt Trap</div><div>20.3 ft</div></div><div><div>Depth Bottom of Filter Material</div><div>21 ft</div></div><div><div>Depth Top of Seal</div><div>21 ft</div></div><div><div>Type of Seal</div><div>bentonite chips</div></div><div><div>Depth Bottom of Seal</div><div>22.5 ft</div></div><div><div>Type of Backfill below Filter Material</div><div>N.A.</div></div><div><div>Bottom of Borehole</div><div>27 ft</div></div></div></div></div></div> <div><div><div><div>6/3/2024</div><div>0900 hrs</div><div>6.0 ft</div></div><div><div>5/1/2024</div><div>1530 hrs</div><div>6.1 ft</div></div><div><div>Date</div><div>Time</div><div>Distance to ▼ below top of riser pipe</div></div></div></div>					

Notes:

Ground elevation based on contour plan provided by Environmental Partners Group.
Boring coordinates provided by Green International based on NAD83.

GEI

Consultants

BORING INFORMATION

NORTHING (ft): 2,909,424
 GROUND SURFACE EL. (ft): 34.2
 VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
 TOTAL DEPTH (ft): 50.0
 LOGGED BY: A. Maupin

EASTING (ft): 804,919
 DATE START/END: 4/29/2024 - 4/30/2024
 DRILLING COMPANY: New England Boring Contractors
 DRILLER NAME: Zack Ohman
 RIG TYPE: Diedrich D-50

BORING**B-3**

PAGE 1 of 3

DRILLING INFORMATION

HAMMER TYPE: Automatic CASING I.D./O.D.: 5 inch/ 5.5 inch CORE BARREL TYPE: NX Double Tube
 AUGER I.D./O.D.: NA / NA DRILL ROD O.D.: 2.63 inch CORE BARREL I.D./O.D.: 2.15 inch / 2.5 inch
 DRILLING METHOD: Driven casing and washed with rotary tooling.
 WATER LEVEL DEPTHS (ft): 15.6 4/30/2024

ABBREVIATIONS: Pen. = Penetration Length S = Split Spoon Sample Qp = Pocket Penetrometer Strength NA, NM = Not Applicable, Not Measured
 Rec. = Recovery Length C = Core Sample Sv = Pocket Torvane Shear Strength Blows per 6 in.: 140-lb hammer falling
 RQD = Rock Quality Designation U = Undisturbed Sample LL = Liquid Limit 30 inches to drive a 2-inch-O.D.
 = Length of Sound Cores > 4 in / Pen., % PI = Plasticity Index split spoon sampler.
 WOR = Weight of Rods DP = Direct Push Sample PID = Photoionization Detector
 WOH = Weight of Hammer HSA = Hollow-Stem Auger I.D./O.D. = Inside Diameter/Outside Diameter

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
		S1	0 to 2	24/14	10-9-8-8			S1 (0-4"): NARROWLY GRADED SAND (SP); ~85% fine to medium sand; ~10% fine to coarse gravel; ~5% non-plastic fines; dark brown with gray gravel; dry. S1 (4"-14"): NARROWLY GRADED SAND (SP); ~90% fine to medium sand; ~10% fine to coarse gravel; light brown to tan; dry.
30	5	S2	4 to 6	24/8	6-6-8-5			S2 (0-1"): Similar to S1(4"-14"); except moist. S2 (1"-8"): CLAYEY GRAVEL WITH SAND (GC); ~65% fine to coarse gravel; ~25% low-plasticity fines; ~10% fine to coarse sand; blue gray; moist; weathered rock.
						Rig chatter ~7 ft.		
10		S3	9 to 11	24/8	10-2-4-3			S3: Similar to S2.
						Gray rock cuttings in drill return at 12 ft.		
20	15	S4	14 to 16	24/7	4-4-3-3			S4: CLAYEY SAND WITH GRAVEL (SC); ~40% fine to coarse sand; ~30% fine to coarse gravel; ~30% low-plasticity fines; tan and gray; moist; indications of weathered rock.
		S5	16 to 18	24/0	5-4-3-3			S5 (tip): Similar to S4; except wet.
		S6	18 to 20	24/6	4-3-3-3			S6: CLAYEY SAND WITH GRAVEL (SC); ~65% fine to coarse sand; ~20% low-plasticity fines; ~15% fine to coarse gravel; tan with gray gravel; moist; gravel sized particles contained weathered rock fragments.
						Rig chatter ~17 ft.		

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908



NORTHING (ft): 2,909,424
GROUND SURFACE EL. (ft): 34.2
VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83

EASTING (ft): 804,919
DATE START/END: 4/29/2024 - 4/30/2024
DRILLING COMPANY: New England Boring Contractors

**BORING
B-3**

PAGE 2 of 3

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
10 25 30 35 40 45		S7	20 to 22	24/8	4-3-4-4	5" casing to 20ft, telescope with 4" casing thereafter. Harder drilling at 35 ft. C1 core times: 3.5, 4, 5.5, 4.5 min/ ft, 3 min/ 7" C2 core times: 5, 4, 4.5, 5 min/ ft, 4 min/ 11" C3: Similar to C1.	FILL	S7: CLAYEY SAND WITH GRAVEL (SC); 51.1% fine to coarse sand; 24.8% low-plasticity fines; 24.1% fine gravel; tan with gray gravel; moist; grain size test performed.
		S8	22 to 24	24/11	5-4-2-2			S8 (0-11"): CLAYEY SAND WITH GRAVEL (SC); 41.5% fine to coarse sand; 41.2% fine to coarse gravel; 17.3% low-plasticity fines; tan and gray; moist; shale-like weathered rock throughout; grain size test performed.
		S9	24 to 26	24/24	1-2-2-2		ORGANICS	S8 (tip): SANDY ORGANIC SOIL (OL); ~65% low-plasticity fines; ~30% fine to coarse sand; ~5% fine to coarse gravel; dark brown; moist; organic fibers throughout. S9: ORGANIC SOIL WITH SAND (OL); ~85% low-plasticity fines; ~10% fine to coarse sand; ~5% fine to coarse gravel; dark brown; moist; organic fibers throughout; slight organic odor.
		S10	26 to 28	24/15	3-8-23-39			S10 (0-6"): CLAYEY SAND WITH GRAVEL (SC); ~70% fine to medium sand; ~15% fine to coarse gravel; ~15% low-plasticity fines; grayish brown; wet; some fibrous material. S10 (6"-15"): CLAYEY GRAVEL (GC); ~40% fine to coarse gravel; ~40% low-plasticity fines; ~20% fine to coarse sand; grayish brown with tan and orange; wet; weathered rock decomposed into soil; gravel crushable into a clayey sand.
		S11	28 to 30	24/10	10-34-41-42		TILL	S11 (0-3"): LEAN CLAY WITH SAND (CL); ~80% low plasticity fines; ~10% fine to coarse sand; ~10% fine to coarse gravel; grayish brown; moist; some organic fibers.
		S12	30 to 31	12/8	13-65-100/0"			S11 (3"-10"): CLAYEY SAND WITH GRAVEL (SC); ~50% fine to coarse sand; ~30% fine to coarse gravel; ~20% low-plasticity fines; gray, tan, and orange; moist to dry; decomposed rock. S12: Similar to S11 (3"-10"), except with some weathered rock fragments.
		S13	32 to 34	24/15	56-46-36-31			S13: Similar to S11 (3"-10").
		S14	34 to 34.8	10/10	14-100/4"			S14 (0-3"): SANDY LEAN CLAY WITH GRAVEL (CL); ~50% low-plasticity fines; ~35% fine to coarse sand; ~15% fine to coarse gravel; grayish brown with tan and dark gray; wet. S14 (3"-10"): CLAYEY GRAVEL WITH SAND (GC); ~35% fine to coarse sand; ~35% low-plasticity fines; ~30% fine to coarse gravel; gray, tan, and orange; wet; decomposed rock into soil. S14 (tip): WIDELY GRADED GRAVEL WITH CLAY (GW-GC); ~80% fine to coarse gravel; ~10% low-plasticity fines; ~10% fine to coarse sand; orange and dark gray; moist; weathered rock; friable gravel easily crushed into fine sand and clay.
		C1	35.5 to 40.1	55/55	78		WEATHERED ROCK	C1: ARGILLITE; hard to medium hard, dark gray, fine grained, fresh to slightly weathered argillite with joints spacing from 3" - 10" dipping 45 to 90 degrees; frequent joints along near-vertical bedding planes, occasional iron stained joints.
		C2	40.1 to 45	59/56	79			C2: Similar to C1.
		C3	45 to 50	60/60	90			C3: Similar to C1.
							BEDROCK	

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908



EASTING (ft): 804,919

DATE START/END: 4/29/2024 - 4/30/2024

DRILLING COMPANY: New England Boring Contractors

PAGE 3 of 3

CITY/STATE: Weymouth, MA
GEI PROJECT NUMBER: 2403908



GEIWOBURN STD 5-NORTH-EAST-LAYER NAME B2A, B3, B4 TYPED LOGS.GPJ 8/22/24

BORING INFORMATION

NORTHING (ft): 2,909,345
 GROUND SURFACE EL. (ft): 13.1
 VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83
 TOTAL DEPTH (ft): 25.5
 LOGGED BY: A. Maupin

EASTING (ft): 804,931
 DATE START/END: 5/2/2024 - 5/2/2024
 DRILLING COMPANY: New England Boring Contractors
 DRILLER NAME: Zack Ohman
 RIG TYPE: Diedrich D-50

BORING**B-4 (OW)**

PAGE 1 of 2

DRILLING INFORMATION

HAMMER TYPE: Automatic CASING I.D./O.D.: 4 inch/ 4.5 inch CORE BARREL TYPE: NX Double Tube
 AUGER I.D./O.D.: NA / NA DRILL ROD O.D.: 2.63 inch CORE BARREL I.D./O.D.: 2.15 inch / 2.5 inch
 DRILLING METHOD: Driven casing and washed with rotary tooling.
 WATER LEVEL DEPTHS (ft): 1.5 5/3/2024

ABBREVIATIONS: Pen. = Penetration Length S = Split Spoon Sample Qp = Pocket Penetrometer Strength NA, NM = Not Applicable, Not Measured
 Rec. = Recovery Length C = Core Sample Sv = Pocket Torvane Shear Strength Blows per 6 in.: 140-lb hammer falling
 RQD = Rock Quality Designation U = Undisturbed Sample LL = Liquid Limit PI = Plasticity Index 30 inches to drive a 2-inch-O.D.
 = Length of Sound Cores > 4 in / Pen., % DP = Direct Push Sample PID = Photoionization Detector split spoon sampler.
 WOR = Weight of Rods I.D./O.D. = Inside Diameter/Outside Diameter
 WOH = Weight of Hammer HSA = Hollow-Stem Auger

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
10 <								

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

CITY/STATE: Weymouth, MA

GEI PROJECT NUMBER: 2403908



NORTHING (ft): 2,909,345
GROUND SURFACE EL. (ft): 13.1
VERT./HORIZ. DATUMS: Town of Weymouth Datum/NAD 83

EASTING (ft): 804,931
DATE START/END: 5/2/2024 - 5/2/2024
DRILLING COMPANY: New England Boring Contractors

**BORING
B-4 (OW)**
PAGE 2 of 2

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
			24			C2 core times: 4, 4, 4, 4.5, 8 min/ ft	BEDROCK	dipping 30 to 80 degrees.
	25							
						Hole reamed to 25.5 ft after C2 was completed. Hole was flushed until the water return was clear.		Boring terminated at 25.5 ft. Installed observation well upon completion.
	30							
	35							
	40							
	45							

NOTES: Ground surface estimated from survey plan.

PROJECT NAME: Weymouth Sewer RR Crossing

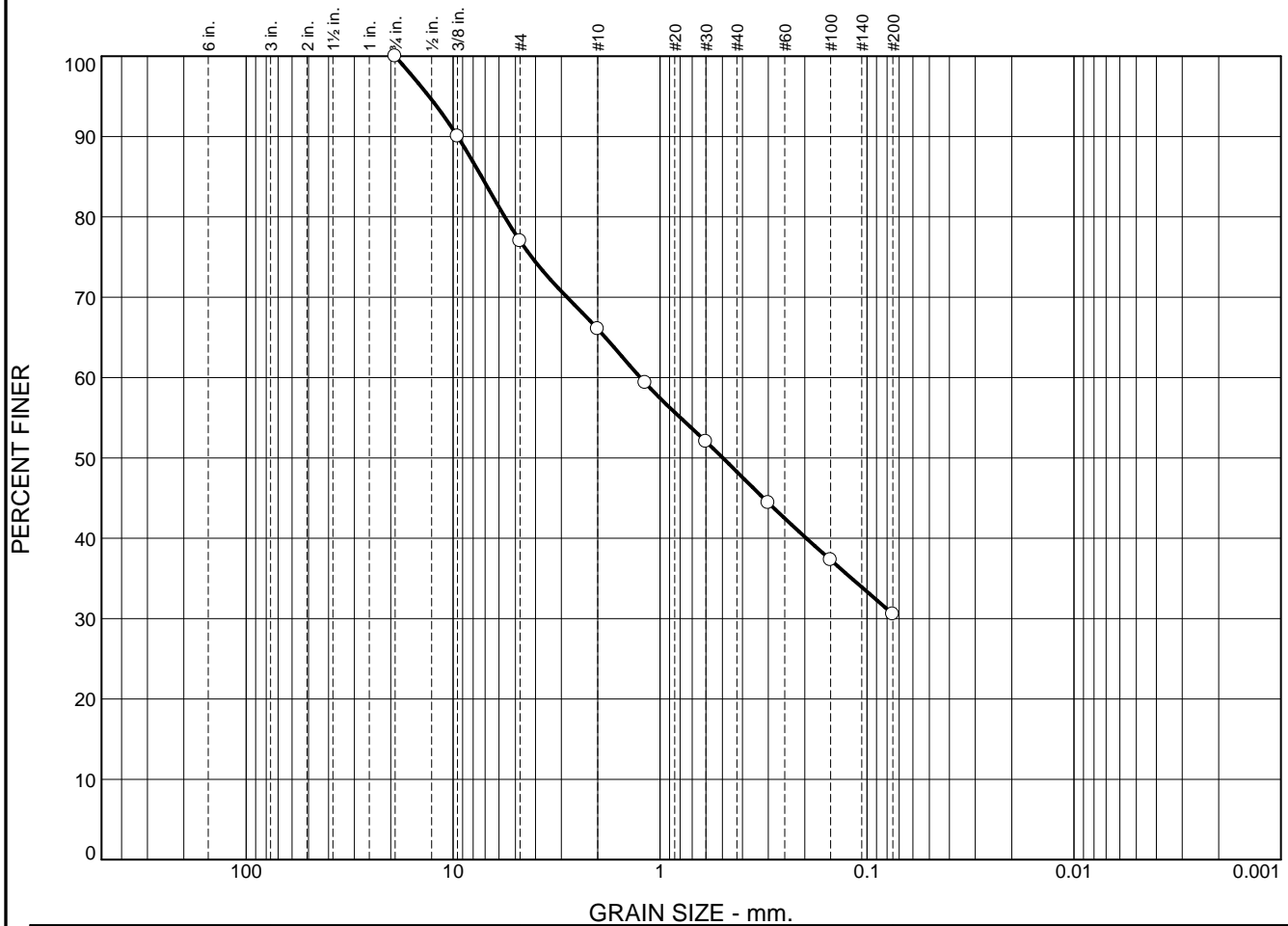
CITY/STATE: Weymouth, MA
GEI PROJECT NUMBER: 2403908



Groundwater Well Installation Log				B-4(OW)	
Project		Weymouth Sewer - Railroad Crossing		GEI Proj. No. 2403908	
City / Town		Weymouth, Massachusetts		Location See Plan	
Client		Environmental Partners Group			
Contractor		New England Boring			
Driller		Zack Ohman		GEI Rep. Anna Maupin	
Install Date		Thurs. 5/2/24			
<div><div><div><div><div><div>Survey</div><div>Datum: Town of Weymouth Datum</div><div>Ground Elevation: Approx. 13.1</div></div><div><div>6/3/2024</div><div>0840 hrs</div><div>3.7 ft</div></div><div><div>5/3/2024</div><div>0930 hrs</div><div>5.2 ft</div></div><div><div>Date</div><div>Time</div><div>Distance to ▼ below top of riser pipe</div></div></div><div><div>General Soil Conditions (Not to Scale)</div><div><div>Topsoil / Fill</div><div>4 ft</div><div>Glacial Till</div><div>12.5 ft</div><div>Weathered/ Soft Rock and Bedrock</div></div></div><div><div><div>Length of Stand Pipe above Ground</div><div>4.4 ft</div></div><div><div>Top of Riser Pipe to Ground</div><div>3.7 ft</div></div><div><div>Type and Thickness of Seal around Stand Pipe</div><div>6 in. cement</div></div><div><div>ID of Stand Pipe</div><div>4.5 in</div></div><div><div>Type of Surface Casing</div><div>Stand Pipe with Lock</div></div><div><div>Depth Bottom of Surface Casing</div><div>1 ft</div></div><div><div>ID and OD of Riser Pipe</div><div>2 in. ID / 2.4 in. OD</div></div><div><div>Type of Riser Pipe</div><div>Sch. 40 PVC</div></div><div><div>Type of Backfill around Riser Pipe</div><div>med. to coarse sand</div></div><div><div>Diameter of Borehole</div><div>4.5 in.</div></div><div><div>Depth Top of Seal</div><div>8.5 ft</div></div><div><div>Type of Seal</div><div>bentonite chips</div></div><div><div>Depth Bottom of Seal</div><div>11.5 ft</div></div><div><div>Depth Top of Screened Section</div><div>15.5</div></div><div><div>Type of Screen</div><div>Sch. 40 PVC</div></div><div><div>Description of Screen Openings</div><div>0.020 in. slots</div></div><div><div>ID and OD of Screened Section</div><div>2 in. ID / 2.4 in. OD</div></div><div><div>Type of Filter Material</div><div>med. to coarse sand</div></div><div><div>Depth Bottom of Screened Section</div><div>25.2</div></div><div><div>Depth Bottom of Silt Trap</div><div>25.5</div></div><div><div>Depth Bottom of Filter Material</div><div>25.5 ft</div></div><div><div>Depth Top of Seal</div><div>N.A.</div></div><div><div>Type of Seal</div><div>N.A.</div></div><div><div>Depth Bottom of Seal</div><div>N.A.</div></div><div><div>Type of Backfill below Filter Material</div><div>N.A.</div></div><div><div>Bottom of Borehole</div><div>25.5 ft</div></div></div></div></div></div> <div><div>Notes:</div><div>Ground elevation based on contour plan provided by Environmental Partners Group. Boring coordinates provided by Green International based on NAD83.</div></div> <div><div>GEI</div><div>Consultants</div></div>					

Appendix B Laboratory Test Data

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	23.0	11.0	17.7	17.7	30.6		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			7.2877	1.2448	0.4973					
Material Description								USCS	AASHTO	
○ Silty SAND with Gravel								SM		

Project No. 2403908 **Client:** Environmental Partners Group
Project: Weymouth Sewer - Railroad Crossing

 ○ **Source:** B-2A(OW) **Depth:** 6-8 ft **Sample No.:** S4(0-10")

Remarks:
 ○ As received WC = 14.0%
 Fines classified visually

GEI Consultants, Inc.
 400 Unicorn Park Drive
 Woburn, MA 01801



Figure

Tested By: S. Larson 5/16/24 **Checked By:** M. Alstede 5/17/24

GRAIN SIZE DISTRIBUTION TEST DATA

5/24/2024

Client: Environmental Partners Group

Project: Weymouth Sewer - Railroad Crossing

Project Number: 2403908

Location: B-2A(OW)

Depth: 6-8 ft

Sample Number: S4(0-10")

Material Description: Silty SAND with Gravel

USCS Classification: SM

Testing Remarks: As received WC = 14.0%

Fines classified visually

Tested by: S. Larson 5/16/24

Checked by: M. Alstede 5/17/24

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
262.80	0.00	203.25	3/4	203.25	100.0
			3/8	229.45	90.0
			#4	263.68	77.0
			#10	292.48	66.0
			#16	310.09	59.3
			#30	329.31	52.0
			#50	349.31	44.4
			#100	367.99	37.3
			#200	385.74	30.6

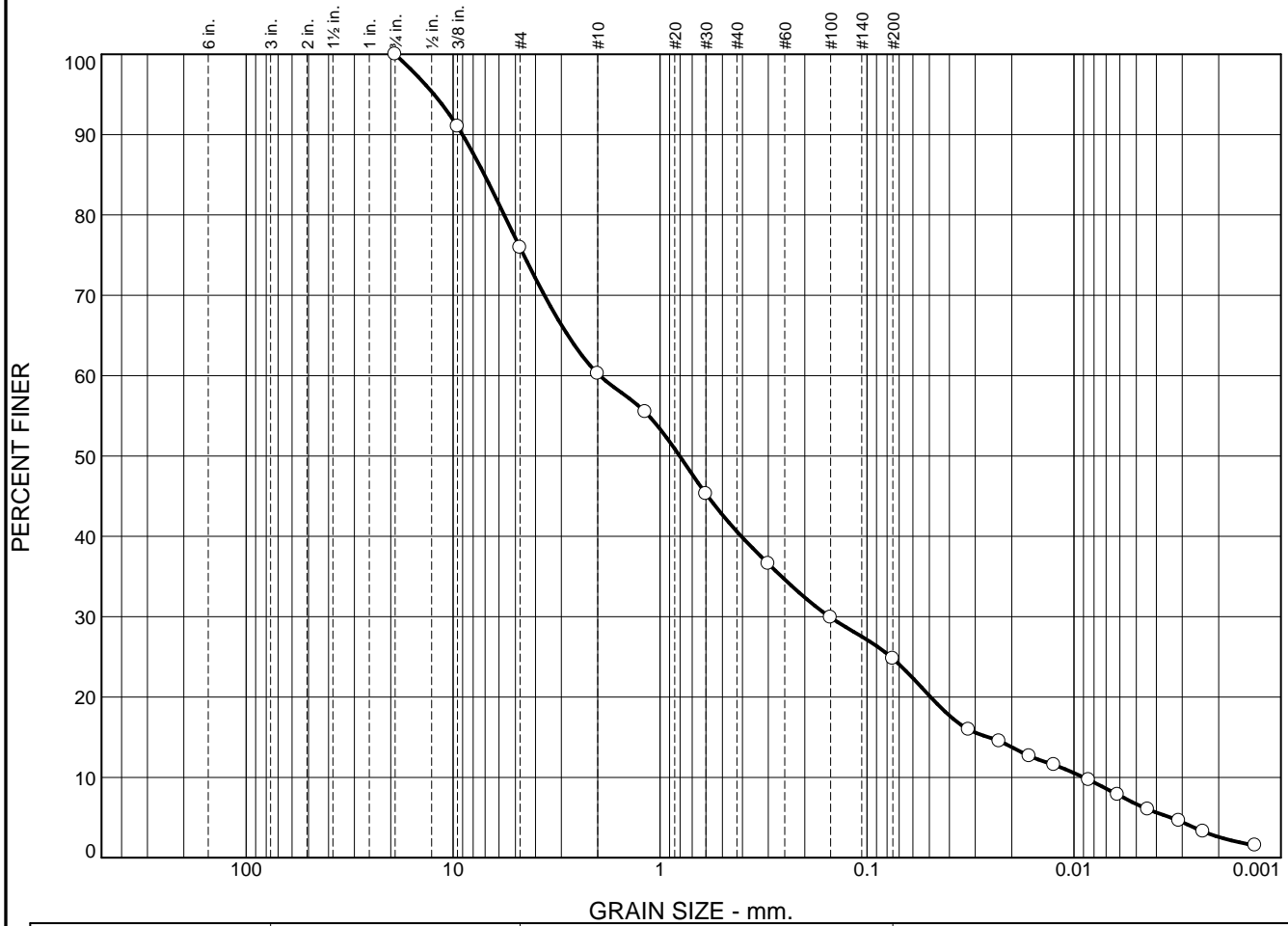
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	23.0	23.0	11.0	17.7	17.7	46.4			30.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.4973	1.2448	5.6278	7.2877	9.5085	13.0749

Fineness Modulus
2.72

Particle Size Distribution Report



	% +3"		% Gravel		% Sand				% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	24.1	15.6	19.7		15.8	18.1		6.7
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
○			7.0593	1.9529	0.8042	0.1518	0.0259	0.0090	1.31	217.46	

Material Description							USCS	AASHTO
Clayey SAND with Gravel							SC	

Project No. 2403908 **Client:** Environmental Partners Group

Project: Weymouth Sewer - Railroad Crossing

Source of Sample: B-3 **Depth:** 20-22 ft **Sample Number:** S7

Remarks:

As received WC = 10.5%
Fines classified visually

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Figure

Tested By: S. Larson 5/20/24

Checked By: M. Alstede 5/21/24

GRAIN SIZE DISTRIBUTION TEST DATA**5/24/2024****Client:** Environmental Partners Group**Project:** Weymouth Sewer - Railroad Crossing**Project Number:** 2403908**Location:** B-3**Depth:** 20-22 ft**Sample Number:** S7**Material Description:** Clayey SAND with Gravel**USCS Classification:** SC**Testing Remarks:** As received WC = 10.5%

Fines classified visually

Tested by: S. Larson 5/20/24**Checked by:** M. Alstede 5/21/24**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
195.80	0.00	31.34	3/4	31.34	100.0
			3/8	48.95	91.0
			#4	78.44	75.9
			#10	109.16	60.3
52.34	0.00	214.03	#16	218.18	55.5
			#30	227.03	45.3
			#50	234.58	36.6
			#100	240.39	29.9
			#200	244.84	24.8

Hydrometer Test Data**Hydrometer test uses material passing #10****Percent passing #10 based upon complete sample = 60.3****Weight of hydrometer sample = 52.34****Automatic temperature correction****Composite correction (fluid density and meniscus height) at 20 deg. C = -4.207****Meniscus correction only = 0.7****Specific gravity of solids = 2.7****Hydrometer type = 151H****Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	24.7	1.0122	1.0087	0.0127	12.9	12.9	0.0322	15.9
4.00	24.8	1.0114	1.0079	0.0127	12.1	13.1	0.0230	14.5
8.00	24.7	1.0104	1.0069	0.0127	11.1	13.4	0.0164	12.7
14.00	24.7	1.0098	1.0063	0.0127	10.5	13.5	0.0125	11.6
31.00	24.6	1.0088	1.0053	0.0127	9.5	13.8	0.0085	9.7
60.00	24.6	1.0078	1.0043	0.0127	8.5	14.0	0.0062	7.9
120.00	24.6	1.0068	1.0033	0.0127	7.5	14.3	0.0044	6.0
242.00	24.7	1.0060	1.0025	0.0127	6.7	14.5	0.0031	4.6
418.00	25.0	1.0052	1.0018	0.0127	5.9	14.7	0.0024	3.3
1399.00	23.2	1.0046	1.0008	0.0129	5.3	14.9	0.0013	1.5

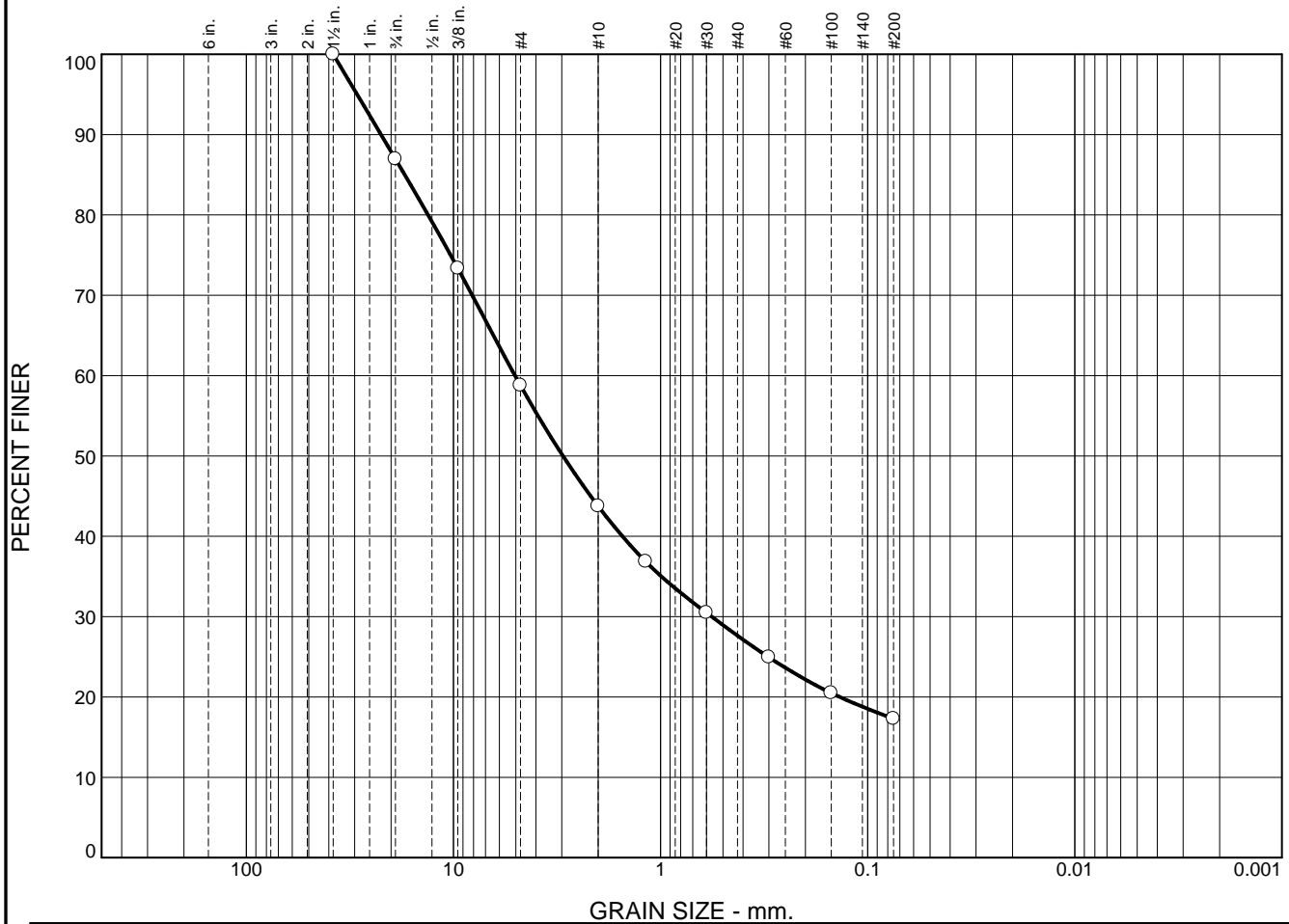
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	24.1	24.1	15.6	19.7	15.8	51.1	18.1	6.7	24.8

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0090	0.0259	0.0493	0.1518	0.8042	1.9529	5.6633	7.0593	9.0108	12.3632

Fineness Modulus	C _u	C _c
3.03	217.46	1.31

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
<input type="radio"/>	0.0		13.0	28.2	15.0	16.2	10.3	17.3			
<input type="checkbox"/>											
<input type="checkbox"/>											
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
<input type="radio"/>			17.1895	5.0451	2.9590	0.5664					
<input type="checkbox"/>											
<input type="checkbox"/>											
Material Description								USCS		AASHTO	
<input type="radio"/> Clayey SAND with Gravel								SC			

Project No. 2403908 **Client:** Environmental Partners Group

Project: Weymouth Sewer - Railroad Crossing

☐ **Source of Sample:** B-3 **Depth:** 22-22.9 ft **Sample Number:** S8(0-11")

Remarks:

☐ As received WC = 15.9%
Fines classified visually

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Figure

Tested By: S. Larson 5/16/24

Checked By: M. Alstede 5/17/24

GRAIN SIZE DISTRIBUTION TEST DATA

5/24/2024

Client: Environmental Partners Group**Project:** Weymouth Sewer - Railroad Crossing**Project Number:** 2403908**Location:** B-3**Depth:** 22-22.9 ft**Sample Number:** S8(0-11")**Material Description:** Clayey SAND with Gravel**USCS Classification:** SC**Testing Remarks:** As received WC = 15.9%

Fines classified visually

Tested by: S. Larson 5/16/24**Checked by:** M. Alstede 5/17/24**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
233.04	0.00	229.66	1.5	229.66	100.0
			3/4	260.06	87.0
			3/8	291.76	73.4
			#4	325.71	58.8
			#10	360.74	43.8
			#16	376.81	36.9
			#30	391.66	30.5
			#50	404.58	24.9
			#100	414.93	20.5
			#200	422.42	17.3

Fractional Components

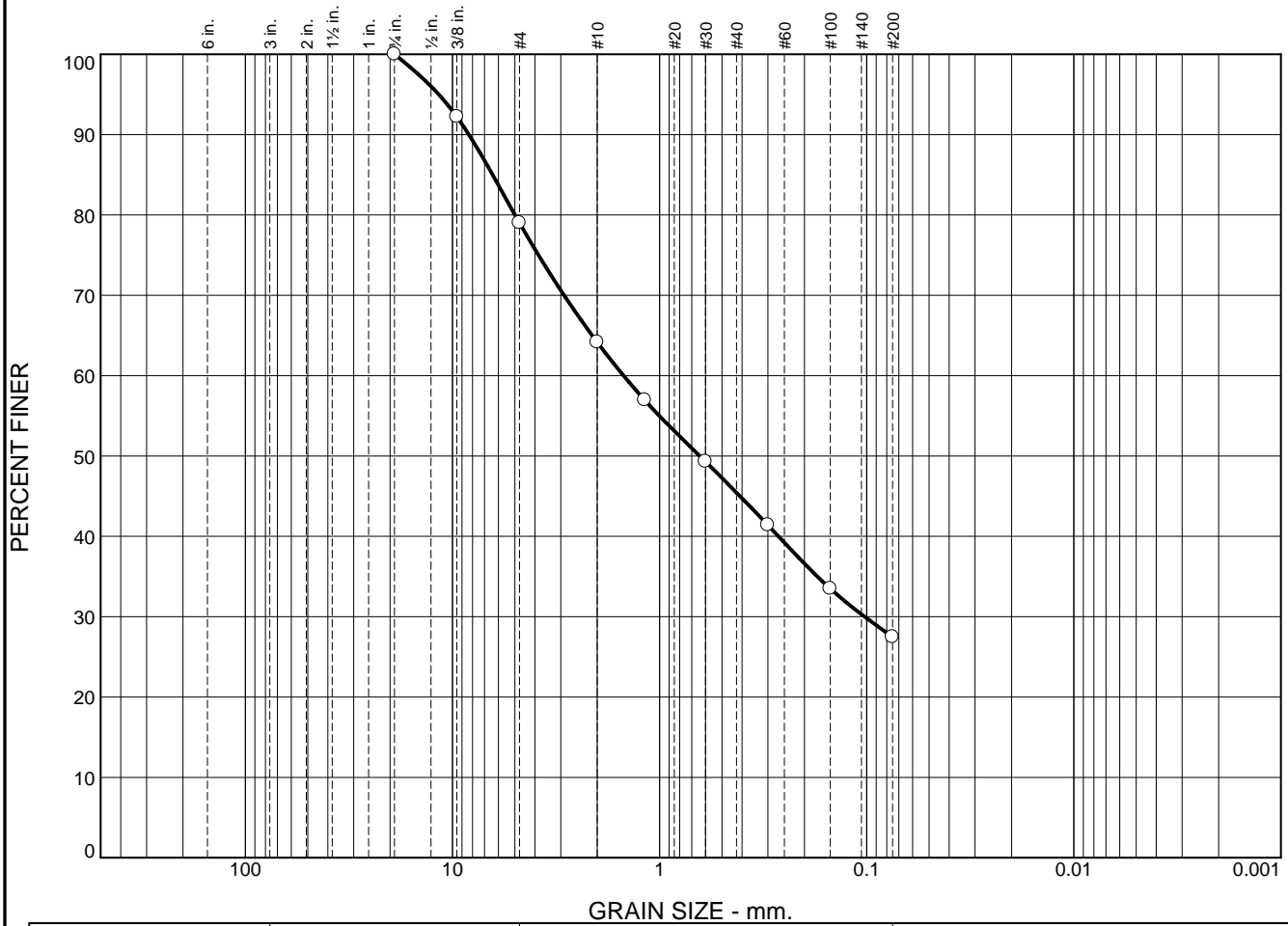
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	13.0	28.2	41.2	15.0	16.2	10.3	41.5			17.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.1364	0.5664	2.9590	5.0451	13.2648	17.1895	22.3748	29.1826

Fineness Modulus

4.22

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
<input type="radio"/>	0.0	0.0	21.0	14.8	18.8	17.9	27.5	
<input type="checkbox"/>								
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀
<input type="radio"/>			6.4006	1.4928	0.6397	0.1024		
Material Description							USCS	AASHTO
<input type="radio"/> Clayey SAND with Gravel							SC	
Project No. 2403908 Client: Environmental Partners Group Project: Weymouth Sewer - Railroad Crossing <input type="radio"/> Source of Sample: B-4 Depth: 4-6 ft Sample Number: S3							Remarks: <input type="radio"/> As received WC = 12.1% Fines classified visually	
<div style="text-align: center;"> GEI Consultants, Inc. 400 Unicorn Park Drive Woburn, MA 01801 </div>								

Figure

Tested By: S. Larson 5/16/24 Checked By: M. Alstede 5/17/24

GRAIN SIZE DISTRIBUTION TEST DATA

5/24/2024

Client: Environmental Partners Group

Project: Weymouth Sewer - Railroad Crossing

Project Number: 2403908

Location: B-4

Depth: 4-6 ft

Sample Number: S3

Material Description: Clayey SAND with Gravel

USCS Classification: SC

Testing Remarks: As received WC = 12.1%

Fines classified visually

Tested by: S. Larson 5/16/24

Checked by: M. Alstede 5/17/24

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
284.24	0.00	191.81	3/4	191.81	100.0
			3/8	213.92	92.2
			#4	251.45	79.0
			#10	293.67	64.2
			#16	314.16	57.0
			#30	335.93	49.3
			#50	358.39	41.4
			#100	380.83	33.5
			#200	397.97	27.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	21.0	21.0	14.8	18.8	17.9	51.5			27.5

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.1024	0.6397	1.4928	4.9917	6.4006	8.3304	11.6517

Fineness Modulus
2.81

Particle Size Distribution Report

GRAIN SIZE - mm.									
% +3"		% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
0.0		0.0	15.4	15.1	21.9	17.4	30.2		
LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		4.8369	1.1101	0.5161					
Material Description							USCS	AASHTO	
○ Clayey SAND with Gravel							SC		
Project No. 2403908 Client: Environmental Partners Group Project: Weymouth Sewer - Railroad Crossing Source of Sample: B-4 Depth: 6-8 ft Sample Number: S4							Remarks: ○ As received WC = 12.2% Fines classified visually		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div> GEI Consultants, Inc. 400 Unicorn Park Drive Woburn, MA 01801 </div> <div style="text-align: center;"> GEI Consultants </div> </div>									

Figure

Checked By: M. Alstede 5/17/24

GRAIN SIZE DISTRIBUTION TEST DATA

5/24/2024

Client: Environmental Partners Group**Project:** Weymouth Sewer - Railroad Crossing**Project Number:** 2403908**Location:** B-4**Depth:** 6-8 ft**Sample Number:** S4**Material Description:** Clayey SAND with Gravel**USCS Classification:** SC**Testing Remarks:** As received WC = 12.2%

Fines classified visually

Tested by: S. Larson 5/16/24**Checked by:** M. Alstede 5/17/24**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
268.75	0.00	204.01	3/4	204.01	100.0
			3/8	210.14	97.7
			#4	245.32	84.6
			#10	285.91	69.5
			#16	309.07	60.9
			#30	333.30	51.9
			#50	356.44	43.3
			#100	376.61	35.8
			#200	391.50	30.2

Fractional Components

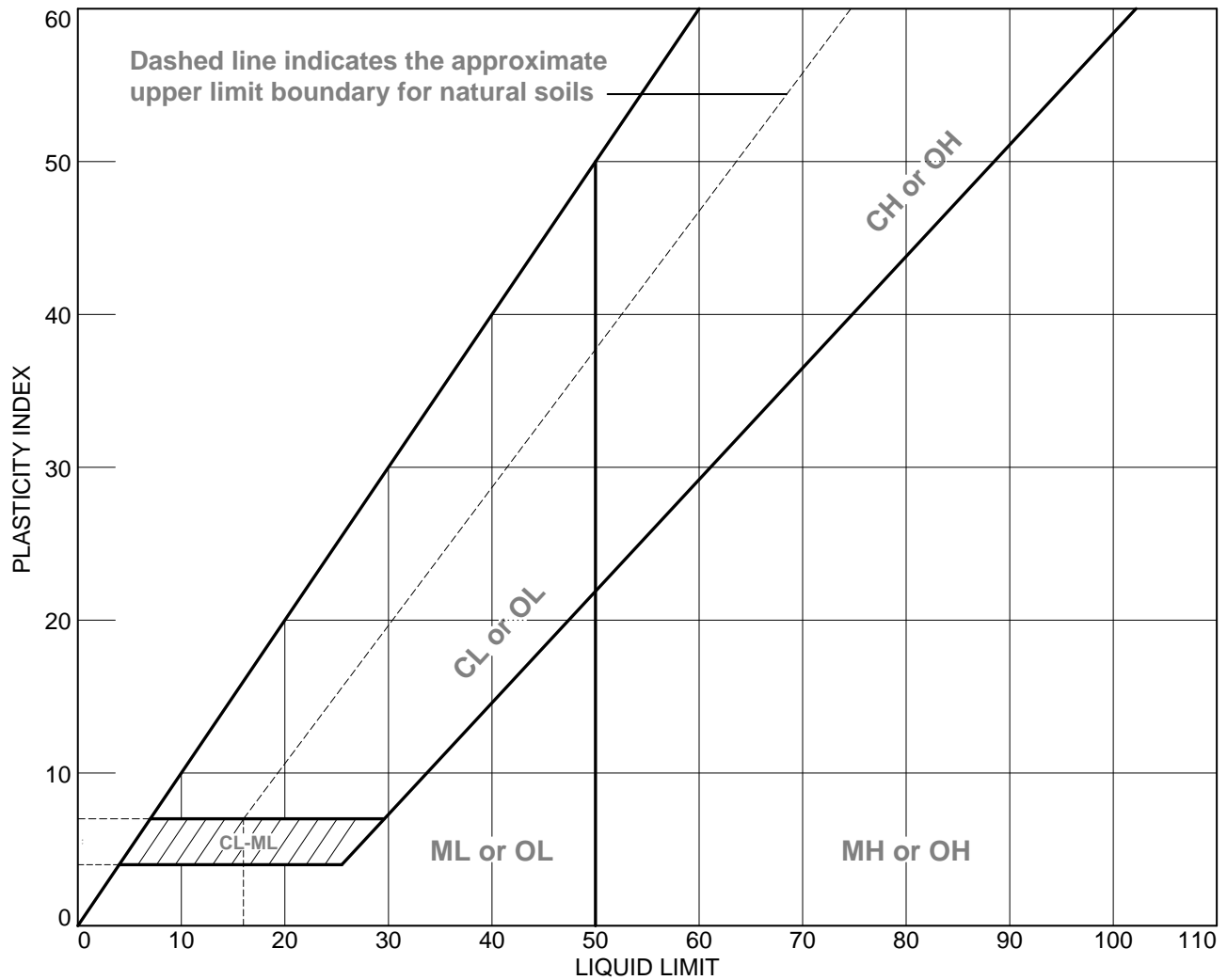
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	15.4	15.4	15.1	21.9	17.4	54.4			30.2

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.5161	1.1101	3.7301	4.8369	6.1275	7.9144

Fineness Modulus

2.54

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2A(OW)	S3(9-19")	4-6 ft	33.3	NP	NV	NP	ML

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Woburn, MA 01801



Client: Environmental Partners Group
Project: Weymouth Sewer - Railroad Crossing

Project No.: 2403908

Figure

Tested By: M. Alstede 5/16/24

Checked By: W. Lukas 5/23/24

LIQUID AND PLASTIC LIMIT TEST DATA

5/24/2024

Client: Environmental Partners Group

Project: Weymouth Sewer - Railroad Crossing

Project Number: 2403908

Location: B-2A(OW)

Depth: 4-6 ft

Sample Number: S3(9-19")

Material Description: SILT

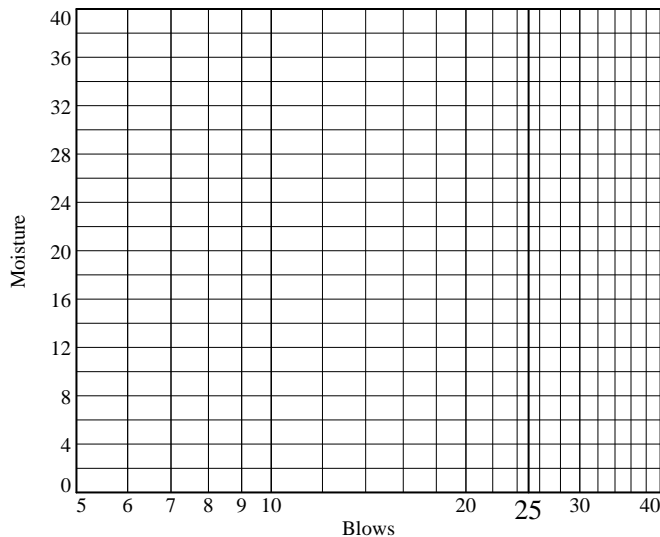
USCS: ML

Tested by: M. Alstede 5/16/24

Checked by: W. Lukas 5/23/24

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						



Liquid Limit= NV
 Plastic Limit= NP
 Plasticity Index= NP
 Natural Moisture= 33.3

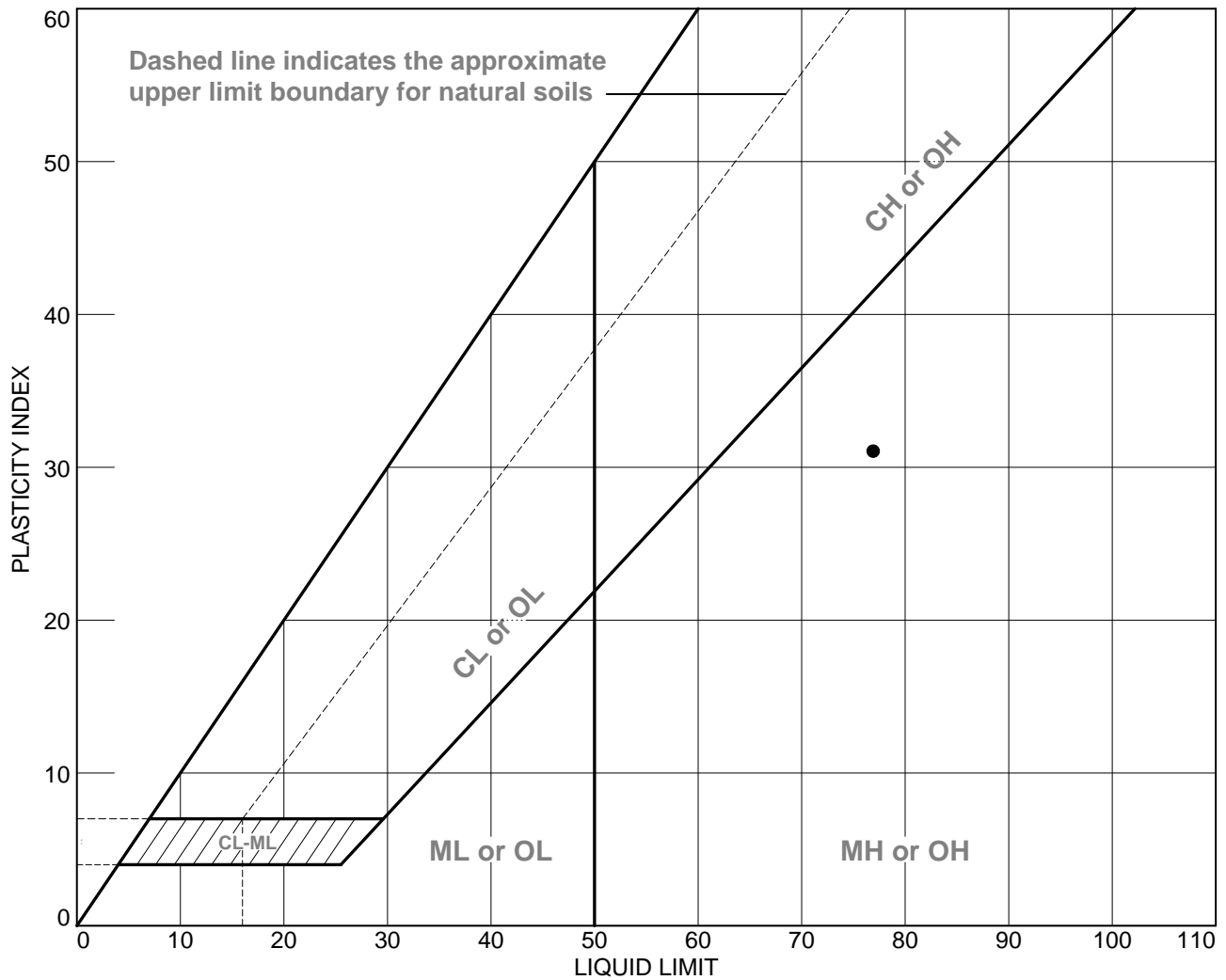
Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare					
Dry+Tare					
Tare					
Moisture					

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
112.89	97.67	51.94	33.3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-3	S9	24-26 ft	89.2	46	77	31	OH

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400 Unicorn Park Drive
Woburn, MA 01801



Client: Environmental Partners Group
Project: Weymouth Sewer - Railroad Crossing

Project No.: 2403908

Figure

Tested By: M. Alstede 5/23/24

Checked By: W. Lukas 5/23/24

LIQUID AND PLASTIC LIMIT TEST DATA

5/24/2024

Client: Environmental Partners Group

Project: Weymouth Sewer - Railroad Crossing

Project Number: 2403908

Location: B-3

Depth: 24-26 ft

Sample Number: S9

Material Description: ORGANIC SOIL

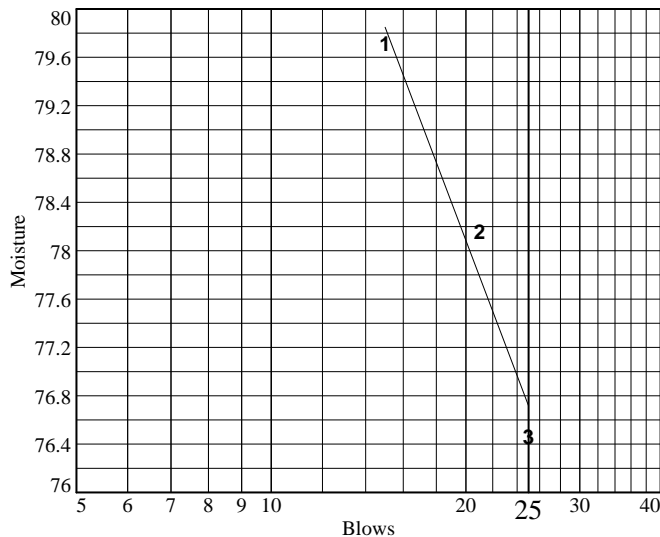
USCS: OH

Tested by: M. Alstede 5/23/24

Checked by: W. Lukas 5/23/24

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.37	34.69	27.85			
Dry+Tare	19.16	28.89	20.80			
Tare	11.37	21.47	11.58			
# Blows	15	21	25			
Moisture	79.7	78.2	76.5			



Liquid Limit=	77
Plastic Limit=	46
Plasticity Index=	31
Natural Moisture=	89.2
Liquidity Index=	1.4

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	17.86	13.16			
Dry+Tare	15.89	11.21			
Tare	11.64	7.00			
Moisture	46.4	46.3			

Water Content and Organic Content

Project No. 2403908
 By S. Larson
 Date 5/20/24
 Checked By M. Aisted
 Date 5/21/24

Boring	B2A	B3					
Sample	S3(9-19")	S9					
Test							
Depth	4-6 ft	24-26 ft					

Water Content

Tare #	B2	B3					
Date in oven	5/14/24	5/15/24					
Date out of oven	5/15/24	5/16/24					
Oven Temperature	110°C	110°C					
Wet Wt. + Tare, A (g)	112.89	106.42					
Dry Wt. + Tare, B (g)	97.62	81.34					
Tare, C (g)	51.94	53.23					
Wt. Water, A - B (g)	15.27	25.08					
Dry Wt, B - C (g)	45.68	28.11					
Water Content* (%)	33.4	89.2					

Organic Content

Tare #	B2	B3					
Date in oven	5/17/24	5/17/24					
Date out of oven	5/20/24	5/20/24					
Oven Temperature	140°C	140°C					
Dry Wt. + Tare, B (g)	97.64	81.33					
Ignited Wt. + Tare, D (g)	96.37	77.19					
Tare, C (g)	51.94	53.23					
Organic Wt, B - D (g)	1.27	4.14					
Dry Wt, B - C (g)	45.70	28.10					
Organic Content* (%)	2.8	14.7					
Percent Fixed* (%)	97.2	85.3					

Formulas

$$\text{Water Content} = (A - B) / (B - C) * 100$$

$$\text{Organic Content} = (B - D) / (B - C) * 100$$

$$\text{Percent Fixed} = (D - C) / (B - C) * 100$$

*Organic Content or Percent Volatiles

REMARKS & TEST NOTES

Water Content

Project No. 2403908

By S. Larson

Date 5/15/24

Checked By M. Astell

Date 5/21/24

Check Method Used

☐ ASTM D2216 (Oven)

☐ ASTM D4643 (Microwave)

☐ Other (indicate)

Boring	B4	B4			
Sample	S2(0-5")	S2(5-11")			
Depth	2-4ft	2-4ft			
Test					
Method (A or B)					
Tare #	CW-3	D-16			
Tare (g)	31.42	17.27			
Wet Wt. + Tare (g)	84.84	84.65			
Dry Wt. + Tare (g)	72.90	76.54			
Wt. Water (g)	11.94	8.11			
Dry Wt. (g)	41.48	59.27			
Water Content (%)	28.8	13.7			

Boring					
Sample					
Depth					
Test					
Method (A or B)					
Tare #					
Tare (g)					
Wet Wt. + Tare (g)					
Dry Wt. + Tare (g)					
Wt. Water (g)					
Dry Wt. (g)					
Water Content (%)					

REMARKS & TEST NOTES

APPENDIX B

Massachusetts State Prevailing Wage Rates



MAURA HEALEY
Governor

KIM DRISCOLL
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H

LAUREN JONES
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: Town of Weymouth

Contract Number: **City/Town:** WEYMOUTH

Description of Work: Installation of 1025' of 42" PVC sewer and 175' of 8" PVC sewer via open trench; Installation of 135' of 60" steel casing pipe and 135' of 42" PVC carrier pipe via pipe jacking; Abandon exist. sewer

Job Location: 0 Bellgrade Street, Weymouth, MA 02188

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.
- This annual update requirement is generally not applicable to 27F "rental of equipment" contracts. For such contracts, the prevailing wage rates issued by DLS shall remain in effect for the duration of the contract term. However, if the prevailing wage rate sheet issued does not contain wage rates for each year covered by the contract term, the Awarding Authority must request updated rate sheets from DLS and provide them to the contractor to ensure the correct rates are being paid throughout the duration of the contract. Additionally, if an Awarding Authority exercises an option to renew or extend the contract term, they must request updated rate sheets from DLS and provide them to the contractor.
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2024	\$41.05	\$14.91	\$20.17	\$0.00	\$76.13
	06/01/2025	\$42.05	\$14.91	\$20.17	\$0.00	\$77.13
	08/01/2025	\$42.05	\$15.41	\$20.17	\$0.00	\$77.63
	12/01/2025	\$42.05	\$15.41	\$21.78	\$0.00	\$79.24
	06/01/2026	\$43.05	\$15.41	\$21.78	\$0.00	\$80.24
	08/01/2026	\$43.05	\$15.91	\$21.78	\$0.00	\$80.74
	12/01/2026	\$43.05	\$15.91	\$23.52	\$0.00	\$82.48
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2024	\$40.88	\$14.91	\$20.17	\$0.00	\$75.96
	06/01/2025	\$41.12	\$14.91	\$20.17	\$0.00	\$76.20
	08/01/2025	\$41.12	\$15.41	\$20.17	\$0.00	\$76.70
	12/01/2025	\$41.12	\$15.41	\$21.78	\$0.00	\$78.31
	06/01/2026	\$43.12	\$15.41	\$21.78	\$0.00	\$80.31
	08/01/2026	\$43.12	\$15.91	\$21.78	\$0.00	\$80.81
	12/01/2026	\$43.12	\$15.91	\$23.52	\$0.00	\$82.55
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2024	\$41.24	\$14.91	\$20.17	\$0.00	\$76.32
	06/01/2025	\$42.24	\$14.91	\$20.17	\$0.00	\$77.32
	08/01/2025	\$42.24	\$15.41	\$20.17	\$0.00	\$77.82
	12/01/2025	\$42.24	\$15.41	\$21.78	\$0.00	\$79.43
	06/01/2026	\$43.24	\$15.41	\$21.78	\$0.00	\$80.43
	08/01/2026	\$43.24	\$15.91	\$21.78	\$0.00	\$80.93
	12/01/2026	\$43.24	\$15.91	\$23.52	\$0.00	\$82.67
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	01/01/2024	\$117.16	\$10.08	\$24.29	\$0.00	\$151.53
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.85	\$9.90	\$18.90	\$0.00	\$75.65
	06/01/2025	\$48.35	\$9.90	\$18.90	\$0.00	\$77.15
	12/01/2025	\$49.85	\$9.90	\$18.90	\$0.00	\$78.65
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.90	\$9.90	\$18.90	\$0.00	\$81.70
	06/01/2027	\$54.50	\$9.90	\$18.90	\$0.00	\$83.30
	12/01/2027	\$56.10	\$9.90	\$18.90	\$0.00	\$84.90
	06/01/2028	\$57.78	\$9.90	\$18.90	\$0.00	\$86.58
	12/01/2028	\$59.45	\$9.90	\$18.90	\$0.00	\$88.25
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.95	\$9.90	\$18.90	\$0.00	\$75.75
	06/01/2025	\$48.45	\$9.90	\$18.90	\$0.00	\$77.25
	12/01/2025	\$49.95	\$9.90	\$18.90	\$0.00	\$78.75
	06/01/2026	\$51.50	\$9.90	\$18.90	\$0.00	\$80.30
	12/01/2026	\$53.00	\$9.90	\$18.90	\$0.00	\$81.80
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT & FROST INSULATORS LOCAL 6 (BOSTON)</i>	12/01/2024	\$42.80	\$14.50	\$11.05	\$0.00	\$68.35
	06/01/2025	\$43.80	\$14.50	\$11.05	\$0.00	\$69.35
	12/01/2025	\$44.80	\$14.50	\$11.05	\$0.00	\$70.35

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASPHALT RAKER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.45	\$9.90	\$18.90	\$0.00	\$75.25
	06/01/2025	\$47.95	\$9.90	\$18.90	\$0.00	\$76.75
	12/01/2025	\$49.45	\$9.90	\$18.90	\$0.00	\$78.25
	06/01/2026	\$51.00	\$9.90	\$18.90	\$0.00	\$79.80
	12/01/2026	\$52.50	\$9.90	\$18.90	\$0.00	\$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.85	\$9.90	\$18.90	\$0.00	\$75.65
	06/01/2025	\$48.35	\$9.90	\$18.90	\$0.00	\$77.15
	12/01/2025	\$49.85	\$9.90	\$18.90	\$0.00	\$78.65
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.90	\$9.90	\$18.90	\$0.00	\$81.70
	06/01/2027	\$54.50	\$9.90	\$18.90	\$0.00	\$83.30
	12/01/2027	\$56.10	\$9.90	\$18.90	\$0.00	\$84.90
	06/01/2028	\$57.78	\$9.90	\$18.90	\$0.00	\$86.58
	12/01/2028	\$59.45	\$9.90	\$18.90	\$0.00	\$88.25
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.95	\$9.90	\$18.90	\$0.00	\$75.75
	06/01/2025	\$48.45	\$9.90	\$18.90	\$0.00	\$77.25
	12/01/2025	\$49.95	\$9.90	\$18.90	\$0.00	\$78.75
	06/01/2026	\$51.50	\$9.90	\$18.90	\$0.00	\$80.30
	12/01/2026	\$53.00	\$9.90	\$18.90	\$0.00	\$81.80
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2024	\$48.12	\$7.07	\$20.60	\$0.00	\$75.79

Apprentice - BOILERMAKER - Local 29

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
2	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
3	70	\$33.68	\$7.07	\$14.23	\$0.00	\$54.98
4	75	\$36.09	\$7.07	\$15.24	\$0.00	\$58.40
5	80	\$38.50	\$7.07	\$16.25	\$0.00	\$61.82
6	85	\$40.90	\$7.07	\$17.28	\$0.00	\$65.25
7	90	\$43.31	\$7.07	\$18.28	\$0.00	\$68.66
8	95	\$45.71	\$7.07	\$19.32	\$0.00	\$72.10

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) <i>BRICKLAYERS LOCAL 3 (QUINCY)</i>	02/01/2025	\$65.80	\$11.49	\$23.59	\$0.00	\$100.88
	08/01/2025	\$67.95	\$11.49	\$23.59	\$0.00	\$103.03
	02/01/2026	\$69.30	\$11.49	\$23.59	\$0.00	\$104.38
	08/01/2026	\$71.50	\$11.49	\$23.59	\$0.00	\$106.58
	02/01/2027	\$72.90	\$11.49	\$23.59	\$0.00	\$107.98

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Quincy

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.90	\$11.49	\$23.59	\$0.00	\$67.98
2	60	\$39.48	\$11.49	\$23.59	\$0.00	\$74.56
3	70	\$46.06	\$11.49	\$23.59	\$0.00	\$81.14
4	80	\$52.64	\$11.49	\$23.59	\$0.00	\$87.72
5	90	\$59.22	\$11.49	\$23.59	\$0.00	\$94.30

Effective Date - 08/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$33.98	\$11.49	\$23.59	\$0.00	\$69.06
2	60	\$40.77	\$11.49	\$23.59	\$0.00	\$75.85
3	70	\$47.57	\$11.49	\$23.59	\$0.00	\$82.65
4	80	\$54.36	\$11.49	\$23.59	\$0.00	\$89.44
5	90	\$61.16	\$11.49	\$23.59	\$0.00	\$96.24

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER OPERATING ENGINEERS LOCAL 4	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN LABORERS - FOUNDATION AND MARINE	12/01/2024	\$47.35	\$9.90	\$19.05	\$0.00	\$76.30
	06/01/2025	\$48.85	\$9.90	\$19.05	\$0.00	\$77.80
	12/01/2025	\$50.35	\$9.90	\$19.05	\$0.00	\$79.30
	06/01/2026	\$51.90	\$9.90	\$19.05	\$0.00	\$80.85
	12/01/2026	\$53.40	\$9.90	\$19.05	\$0.00	\$82.35
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER LABORERS - FOUNDATION AND MARINE	12/01/2024	\$46.20	\$9.90	\$19.05	\$0.00	\$75.15
	06/01/2025	\$47.70	\$9.90	\$19.05	\$0.00	\$76.65
	12/01/2025	\$49.20	\$9.90	\$19.05	\$0.00	\$78.15
	06/01/2026	\$50.75	\$9.90	\$19.05	\$0.00	\$79.70
	12/01/2026	\$52.25	\$9.90	\$19.05	\$0.00	\$81.20
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN LABORERS - FOUNDATION AND MARINE	12/01/2024	\$46.53	\$9.90	\$19.05	\$0.00	\$75.48
	06/01/2025	\$48.03	\$9.90	\$19.05	\$0.00	\$76.98
	12/01/2025	\$49.53	\$9.90	\$19.05	\$0.00	\$78.48
	06/01/2026	\$51.08	\$9.90	\$19.05	\$0.00	\$80.03
	12/01/2026	\$52.58	\$9.90	\$19.05	\$0.00	\$81.53
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						

CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	03/01/2025	\$49.62	\$9.83	\$19.97	\$0.00	\$79.42
	09/01/2025	\$50.87	\$9.83	\$19.97	\$0.00	\$80.67
	03/01/2026	\$52.12	\$9.83	\$19.97	\$0.00	\$81.92
	09/01/2026	\$53.37	\$9.83	\$19.97	\$0.00	\$83.17
	03/01/2027	\$54.62	\$9.83	\$19.97	\$0.00	\$84.42

Apprentice - CARPENTER - Zone 2 Eastern MA

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$22.33	\$9.83	\$1.73	\$0.00	\$33.89
2	45	\$22.33	\$9.83	\$1.73	\$0.00	\$33.89
3	55	\$27.29	\$9.83	\$3.40	\$0.00	\$40.52
4	55	\$27.29	\$9.83	\$3.40	\$0.00	\$40.52
5	70	\$34.73	\$9.83	\$16.51	\$0.00	\$61.07
6	70	\$34.73	\$9.83	\$16.51	\$0.00	\$61.07
7	80	\$39.70	\$9.83	\$18.24	\$0.00	\$67.77
8	80	\$39.70	\$9.83	\$18.24	\$0.00	\$67.77

Effective Date - 09/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$22.89	\$9.83	\$1.73	\$0.00	\$34.45
2	45	\$22.89	\$9.83	\$1.73	\$0.00	\$34.45
3	55	\$27.98	\$9.83	\$3.40	\$0.00	\$41.21
4	55	\$27.98	\$9.83	\$3.40	\$0.00	\$41.21
5	70	\$35.61	\$9.83	\$16.51	\$0.00	\$61.95
6	70	\$35.61	\$9.83	\$16.51	\$0.00	\$61.95
7	80	\$40.70	\$9.83	\$18.24	\$0.00	\$68.77
8	80	\$40.70	\$9.83	\$18.24	\$0.00	\$68.77

Notes:

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME <i>CARPENTERS -ZONE 2 (Wood Frame)</i>	10/01/2024	\$31.91	\$7.02	\$6.47	\$0.00	\$45.40
	10/01/2025	\$33.21	\$7.02	\$6.47	\$0.00	\$46.70
	10/01/2026	\$34.51	\$7.02	\$6.47	\$0.00	\$48.00

Classification	Effective Date		Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
All Aspects of New Wood Frame Work							
Apprentice - CARPENTER (Wood Frame) - Zone 2							
Effective Date - 10/01/2024							
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$15.96	\$7.02	\$0.00	\$0.00	\$22.98	
2	50	\$15.96	\$7.02	\$0.00	\$0.00	\$22.98	
3	55	\$17.55	\$7.02	\$2.00	\$0.00	\$26.57	
4	55	\$17.55	\$7.02	\$2.00	\$0.00	\$26.57	
5	70	\$22.34	\$7.02	\$6.47	\$0.00	\$35.83	
6	70	\$22.34	\$7.02	\$6.47	\$0.00	\$35.83	
7	80	\$25.53	\$7.02	\$6.47	\$0.00	\$39.02	
8	80	\$25.53	\$7.02	\$6.47	\$0.00	\$39.02	
Effective Date - 10/01/2025							
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$16.61	\$7.02	\$0.00	\$0.00	\$23.63	
2	50	\$16.61	\$7.02	\$0.00	\$0.00	\$23.63	
3	55	\$18.27	\$7.02	\$2.00	\$0.00	\$27.29	
4	55	\$18.27	\$7.02	\$2.00	\$0.00	\$27.29	
5	70	\$23.25	\$7.02	\$6.47	\$0.00	\$36.74	
6	70	\$23.25	\$7.02	\$6.47	\$0.00	\$36.74	
7	80	\$26.57	\$7.02	\$6.47	\$0.00	\$40.06	
8	80	\$26.57	\$7.02	\$6.47	\$0.00	\$40.06	
Notes:							
Apprentice to Journeyworker Ratio:1:5							
CEMENT MASONRY/PLASTERING		07/01/2024	\$49.19	\$13.35	\$24.21	\$1.80	\$88.55
BRICKLAYERS LOCAL 3 (QUINCY)							

Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (Quincy)

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.60	\$13.35	\$16.43	\$0.00	\$54.38
2	60	\$29.51	\$13.35	\$19.21	\$1.80	\$63.87
3	65	\$31.97	\$13.35	\$20.21	\$1.80	\$67.33
4	70	\$34.43	\$13.35	\$21.21	\$1.80	\$70.79
5	75	\$36.89	\$13.35	\$22.21	\$1.80	\$74.25
6	80	\$39.35	\$13.35	\$23.21	\$1.80	\$77.71
7	90	\$44.27	\$13.35	\$24.21	\$1.80	\$83.63

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
LABORERS - ZONE 1	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75

For apprentice rates see "Apprentice- LABORER"

CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	12/01/2024	\$58.18	\$15.55	\$16.50	\$0.00	\$90.23
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$59.51	\$15.55	\$16.50	\$0.00	\$91.56
	12/01/2025	\$60.98	\$15.55	\$16.50	\$0.00	\$93.03
	06/01/2026	\$62.31	\$15.55	\$16.50	\$0.00	\$94.36
	12/01/2026	\$63.79	\$15.55	\$16.50	\$0.00	\$95.84

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

COMPRESSOR OPERATOR	12/01/2024	\$36.67	\$15.55	\$16.50	\$0.00	\$68.72
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$37.52	\$15.55	\$16.50	\$0.00	\$69.57
	12/01/2025	\$38.47	\$15.55	\$16.50	\$0.00	\$70.52
	06/01/2026	\$39.33	\$15.55	\$16.50	\$0.00	\$71.38
	12/01/2026	\$40.28	\$15.55	\$16.50	\$0.00	\$72.33

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

DELEADER (BRIDGE)	01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36
PAINTERS LOCAL 35 - ZONE 2						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER	12/02/2024	\$47.25	\$9.90	\$18.90	\$0.00	\$76.05
LABORERS - ZONE 1	06/02/2025	\$48.75	\$9.90	\$18.90	\$0.00	\$77.55
	12/01/2025	\$50.25	\$9.90	\$18.90	\$0.00	\$79.05
	06/01/2026	\$51.80	\$9.90	\$18.90	\$0.00	\$80.60
	12/07/2026	\$53.30	\$9.90	\$18.90	\$0.00	\$82.10
	06/07/2027	\$54.90	\$9.90	\$18.90	\$0.00	\$83.70
	12/06/2027	\$56.50	\$9.90	\$18.90	\$0.00	\$85.30
	06/05/2028	\$58.18	\$9.90	\$18.90	\$0.00	\$86.98
	12/04/2028	\$59.85	\$9.90	\$18.90	\$0.00	\$88.65
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR	12/02/2024	\$47.00	\$9.90	\$18.90	\$0.00	\$75.80
LABORERS - ZONE 1	06/02/2025	\$48.50	\$9.90	\$18.90	\$0.00	\$77.30
	12/01/2025	\$50.00	\$9.90	\$18.90	\$0.00	\$78.80
	06/01/2026	\$51.55	\$9.90	\$18.90	\$0.00	\$80.35
	12/07/2026	\$53.05	\$9.90	\$18.90	\$0.00	\$81.85
	06/07/2027	\$54.65	\$9.90	\$18.90	\$0.00	\$83.45
	12/06/2027	\$56.25	\$9.90	\$18.90	\$0.00	\$85.05
	06/05/2028	\$57.93	\$9.90	\$18.90	\$0.00	\$86.73
	12/04/2028	\$59.60	\$9.90	\$18.90	\$0.00	\$88.40
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER	12/02/2024	\$46.25	\$9.90	\$18.90	\$0.00	\$75.05
LABORERS - ZONE 1	06/02/2025	\$47.75	\$9.90	\$18.90	\$0.00	\$76.55
	12/01/2025	\$49.25	\$9.90	\$18.90	\$0.00	\$78.05
	06/01/2026	\$50.80	\$9.90	\$18.90	\$0.00	\$79.60
	12/07/2026	\$52.30	\$9.90	\$18.90	\$0.00	\$81.10
	06/07/2027	\$53.90	\$9.90	\$18.90	\$0.00	\$82.70
	12/06/2027	\$55.50	\$9.90	\$18.90	\$0.00	\$84.30
	06/05/2028	\$57.18	\$9.90	\$18.90	\$0.00	\$85.98
	12/04/2028	\$58.85	\$9.90	\$18.90	\$0.00	\$87.65
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER	08/01/2024	\$78.11	\$10.08	\$21.66	\$0.00	\$109.85
PILE DRIVER LOCAL 56 (ZONE 1)						
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Diver wage 70/80/90 2A \$69.83, 3A \$91.79,4A \$102.14 Total Rate						
DIVER TENDER	08/01/2024	\$55.79	\$10.08	\$24.29	\$0.00	\$90.16
PILE DRIVER LOCAL 56 (ZONE 1)						
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Piledriver wage 70/80/90 2A \$54.20, 3A \$73.93,4A \$82.05 Total Rate						
DIVER TENDER (EFFLUENT)	08/01/2024	\$83.69	\$10.08	\$24.29	\$0.00	\$118.06
PILE DRIVER LOCAL 56 (ZONE 1)						
For apprentice rates see "Apprentice- PILE DRIVER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2024	\$117.16	\$10.08	\$24.29	\$0.00	\$151.53
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i>	07/01/2020	\$26.77	\$6.67	\$3.93	\$0.16	\$37.53
ELECTRICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2025	\$64.26	\$13.00	\$23.03	\$0.00	\$100.29
	09/01/2025	\$66.17	\$13.00	\$23.09	\$0.00	\$102.26
	03/01/2026	\$67.37	\$13.00	\$23.12	\$0.00	\$103.49
	09/01/2026	\$69.28	\$13.00	\$23.18	\$0.00	\$105.46
	03/01/2027	\$70.47	\$13.00	\$23.21	\$0.00	\$106.68
	09/01/2027	\$72.39	\$13.00	\$23.27	\$0.00	\$108.66
	03/01/2028	\$73.59	\$13.00	\$23.31	\$0.00	\$109.90

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$25.70	\$13.00	\$0.77	\$0.00	\$39.47
2	40	\$25.70	\$13.00	\$0.77	\$0.00	\$39.47
3	45	\$28.92	\$13.00	\$17.17	\$0.00	\$59.09
4	45	\$28.92	\$13.00	\$17.17	\$0.00	\$59.09
5	50	\$32.13	\$13.00	\$17.70	\$0.00	\$62.83
6	55	\$35.34	\$13.00	\$18.24	\$0.00	\$66.58
7	60	\$38.56	\$13.00	\$18.77	\$0.00	\$70.33
8	65	\$41.77	\$13.00	\$19.30	\$0.00	\$74.07
9	70	\$44.98	\$13.00	\$19.83	\$0.00	\$77.81
10	75	\$48.20	\$13.00	\$20.37	\$0.00	\$81.57

Effective Date - 09/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$26.47	\$13.00	\$0.79	\$0.00	\$40.26
2	40	\$26.47	\$13.00	\$0.79	\$0.00	\$40.26
3	45	\$29.78	\$13.00	\$17.19	\$0.00	\$59.97
4	45	\$29.78	\$13.00	\$17.19	\$0.00	\$59.97
5	50	\$33.09	\$13.00	\$17.73	\$0.00	\$63.82
6	55	\$36.39	\$13.00	\$18.27	\$0.00	\$67.66
7	60	\$39.70	\$13.00	\$18.80	\$0.00	\$71.50
8	65	\$43.01	\$13.00	\$19.34	\$0.00	\$75.35
9	70	\$46.32	\$13.00	\$19.87	\$0.00	\$79.19
10	75	\$49.63	\$13.00	\$20.41	\$0.00	\$83.04

Notes: :

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2022	\$65.62	\$16.03	\$20.21	\$0.00	\$101.86
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Apprentice - ELEVATOR CONSTRUCTOR - Local 4

Effective Date - 01/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.81	\$16.03	\$0.00	\$0.00	\$48.84
2	55	\$36.09	\$16.03	\$20.21	\$0.00	\$72.33
3	65	\$42.65	\$16.03	\$20.21	\$0.00	\$78.89
4	70	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
5	80	\$52.50	\$16.03	\$20.21	\$0.00	\$88.74

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
<i>ELEVATOR CONSTRUCTORS LOCAL 4</i>						

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY)	12/01/2024	\$46.45	\$9.90	\$18.90	\$0.00	\$75.25
<i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>						
	06/01/2025	\$47.95	\$9.90	\$18.90	\$0.00	\$76.75
	12/01/2025	\$49.45	\$9.90	\$18.90	\$0.00	\$78.25
	06/01/2026	\$51.00	\$9.90	\$18.90	\$0.00	\$79.80
	12/01/2026	\$52.50	\$9.90	\$18.90	\$0.00	\$81.30

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY	11/01/2024	\$51.78	\$15.30	\$16.40	\$0.00	\$83.48
<i>OPERATING ENGINEERS LOCAL 4</i>						
	05/01/2025	\$53.22	\$15.30	\$16.40	\$0.00	\$84.92
	11/01/2025	\$54.51	\$15.30	\$16.40	\$0.00	\$86.21
	05/01/2026	\$55.95	\$15.30	\$16.40	\$0.00	\$87.65
	11/01/2026	\$57.24	\$15.30	\$16.40	\$0.00	\$88.94
	05/01/2027	\$58.67	\$15.30	\$16.40	\$0.00	\$90.37

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY	11/01/2024	\$53.37	\$15.30	\$16.40	\$0.00	\$85.07
<i>OPERATING ENGINEERS LOCAL 4</i>						
	05/01/2025	\$54.82	\$15.30	\$16.40	\$0.00	\$86.52
	11/01/2025	\$56.12	\$15.30	\$16.40	\$0.00	\$87.82
	05/01/2026	\$57.57	\$15.30	\$16.40	\$0.00	\$89.27
	11/01/2026	\$58.87	\$15.30	\$16.40	\$0.00	\$90.57
	05/01/2027	\$60.32	\$15.30	\$16.40	\$0.00	\$92.02

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY	11/01/2024	\$25.37	\$15.30	\$16.40	\$0.00	\$57.07
<i>OPERATING ENGINEERS LOCAL 4</i>						
	05/01/2025	\$26.22	\$15.30	\$16.40	\$0.00	\$57.92
	11/01/2025	\$26.98	\$15.30	\$16.40	\$0.00	\$58.68
	05/01/2026	\$27.83	\$15.30	\$16.40	\$0.00	\$59.53
	11/01/2026	\$28.59	\$15.30	\$16.40	\$0.00	\$60.29
	05/01/2027	\$29.44	\$15.30	\$16.40	\$0.00	\$61.14

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 103</i>	03/01/2025	\$64.26	\$13.00	\$23.03	\$0.00	\$100.29
	09/01/2025	\$66.17	\$13.00	\$23.09	\$0.00	\$102.26
	03/01/2026	\$67.37	\$13.00	\$23.12	\$0.00	\$103.49
	09/01/2026	\$69.28	\$13.00	\$23.18	\$0.00	\$105.46
	03/01/2027	\$70.47	\$13.00	\$23.21	\$0.00	\$106.68
	09/01/2027	\$72.39	\$13.00	\$23.27	\$0.00	\$108.66
	03/01/2028	\$73.59	\$13.00	\$23.31	\$0.00	\$109.90
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS LOCAL 103</i>	03/01/2025	\$51.41	\$13.00	\$20.90	\$0.00	\$85.31
	09/01/2025	\$52.94	\$13.00	\$20.95	\$0.00	\$86.89
	03/01/2026	\$53.90	\$13.00	\$20.98	\$0.00	\$87.88
	09/01/2026	\$55.42	\$13.00	\$21.02	\$0.00	\$89.44
	03/01/2027	\$56.38	\$13.00	\$21.05	\$0.00	\$90.43
	09/01/2027	\$57.91	\$13.00	\$21.10	\$0.00	\$92.01
	03/01/2028	\$58.87	\$13.00	\$21.13	\$0.00	\$93.00
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$45.96	\$15.55	\$16.50	\$0.00	\$78.01
	06/01/2025	\$47.02	\$15.55	\$16.50	\$0.00	\$79.07
	12/01/2025	\$48.19	\$15.55	\$16.50	\$0.00	\$80.24
	06/01/2026	\$49.25	\$15.55	\$16.50	\$0.00	\$81.30
	12/01/2026	\$50.43	\$15.55	\$16.50	\$0.00	\$82.48
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$27.01	\$9.90	\$18.90	\$0.00	\$55.81
	06/01/2025	\$28.09	\$9.90	\$18.90	\$0.00	\$56.89
	12/01/2025	\$28.09	\$9.90	\$18.90	\$0.00	\$56.89
	06/01/2026	\$29.21	\$9.90	\$18.90	\$0.00	\$58.01
	12/01/2026	\$29.21	\$9.90	\$18.90	\$0.00	\$58.01
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE 1</i>	03/01/2025	\$57.73	\$8.83	\$20.27	\$0.00	\$86.83
	09/01/2025	\$59.23	\$8.83	\$20.27	\$0.00	\$88.33
	03/01/2026	\$60.73	\$8.83	\$20.27	\$0.00	\$89.83
	09/01/2026	\$62.23	\$8.83	\$20.27	\$0.00	\$91.33
	03/01/2027	\$63.73	\$8.83	\$20.27	\$0.00	\$92.83

Classification
Effective Date
Base Wage
Health
Pension
**Supplemental
Unemployment**
Total Rate
Apprentice - FLOORCOVERER - Local 2168 Zone I
Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$25.98	\$8.83	\$1.76	\$0.00	\$36.57
2	45	\$25.98	\$8.83	\$1.76	\$0.00	\$36.57
3	55	\$31.75	\$8.83	\$3.52	\$0.00	\$44.10
4	55	\$31.75	\$8.83	\$3.52	\$0.00	\$44.10
5	70	\$40.41	\$8.83	\$16.75	\$0.00	\$65.99
6	70	\$40.41	\$8.83	\$16.75	\$0.00	\$65.99
7	80	\$46.18	\$8.83	\$18.51	\$0.00	\$73.52
8	80	\$46.18	\$8.83	\$18.51	\$0.00	\$73.52

Effective Date - 09/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$26.65	\$8.83	\$1.76	\$0.00	\$37.24
2	45	\$26.65	\$8.83	\$1.76	\$0.00	\$37.24
3	55	\$32.58	\$8.83	\$3.52	\$0.00	\$44.93
4	55	\$32.58	\$8.83	\$3.52	\$0.00	\$44.93
5	70	\$41.46	\$8.83	\$16.75	\$0.00	\$67.04
6	70	\$41.46	\$8.83	\$16.75	\$0.00	\$67.04
7	80	\$47.38	\$8.83	\$18.51	\$0.00	\$74.72
8	80	\$47.38	\$8.83	\$18.51	\$0.00	\$74.72

Notes: Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GENERATOR/LIGHTING PLANT/HEATERS	12/01/2024	\$36.67	\$15.55	\$16.50	\$0.00	\$68.72
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$37.52	\$15.55	\$16.50	\$0.00	\$69.57
	12/01/2025	\$38.47	\$15.55	\$16.50	\$0.00	\$70.52
	06/01/2026	\$39.33	\$15.55	\$16.50	\$0.00	\$71.38
	12/01/2026	\$40.28	\$15.55	\$16.50	\$0.00	\$72.33

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)	01/01/2025	\$47.96	\$9.95	\$23.95	\$0.00	\$81.86
GLAZIERS LOCAL 35 (ZONE 2)						

Apprentice - GLAZIER - Local 35 Zone 2
Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.98	\$9.95	\$0.00	\$0.00	\$33.93
2	55	\$26.38	\$9.95	\$6.66	\$0.00	\$42.99
3	60	\$28.78	\$9.95	\$7.26	\$0.00	\$45.99
4	65	\$31.17	\$9.95	\$7.87	\$0.00	\$48.99
5	70	\$33.57	\$9.95	\$20.32	\$0.00	\$63.84
6	75	\$35.97	\$9.95	\$20.93	\$0.00	\$66.85
7	80	\$38.37	\$9.95	\$21.53	\$0.00	\$69.85
8	90	\$43.16	\$9.95	\$22.74	\$0.00	\$75.85

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58

Apprentice - OPERATING ENGINEERS - Local 4

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$31.37	\$0.00	\$0.00	\$0.00	\$31.37
2	60	\$34.22	\$15.55	\$16.50	\$0.00	\$66.27
3	65	\$37.07	\$15.55	\$16.50	\$0.00	\$69.12
4	70	\$39.92	\$15.55	\$16.50	\$0.00	\$71.97
5	75	\$42.77	\$15.55	\$16.50	\$0.00	\$74.82
6	80	\$45.62	\$15.55	\$16.50	\$0.00	\$77.67
7	85	\$48.48	\$15.55	\$16.50	\$0.00	\$80.53
8	90	\$51.33	\$15.55	\$16.50	\$0.00	\$83.38

Effective Date - 06/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$32.08	\$0.00	\$0.00	\$0.00	\$32.08
2	60	\$35.00	\$15.55	\$16.50	\$0.00	\$67.05
3	65	\$37.91	\$15.55	\$16.50	\$0.00	\$69.96
4	70	\$40.83	\$15.55	\$16.50	\$0.00	\$72.88
5	75	\$43.75	\$15.55	\$16.50	\$0.00	\$75.80
6	80	\$46.66	\$15.55	\$16.50	\$0.00	\$78.71
7	85	\$49.58	\$15.55	\$16.50	\$0.00	\$81.63
8	90	\$52.50	\$15.55	\$16.50	\$0.00	\$84.55

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK)	02/01/2025	\$59.13	\$14.91	\$28.27	\$2.98	\$105.29
SHEETMETAL WORKERS LOCAL 17 - A	08/01/2025	\$60.98	\$14.91	\$28.27	\$2.98	\$107.14
	02/01/2026	\$62.93	\$14.91	\$28.27	\$2.98	\$109.09

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS)	03/01/2025	\$64.26	\$13.00	\$23.03	\$0.00	\$100.29
ELECTRICIANS LOCAL 103	09/01/2025	\$66.17	\$13.00	\$23.09	\$0.00	\$102.26
	03/01/2026	\$67.37	\$13.00	\$23.12	\$0.00	\$103.49
	09/01/2026	\$69.28	\$13.00	\$23.18	\$0.00	\$105.46
	03/01/2027	\$70.47	\$13.00	\$23.21	\$0.00	\$106.68
	09/01/2027	\$72.39	\$13.00	\$23.27	\$0.00	\$108.66
	03/01/2028	\$73.59	\$13.00	\$23.31	\$0.00	\$109.90

For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR)	02/01/2025	\$59.13	\$14.91	\$28.27	\$2.98	\$105.29
SHEETMETAL WORKERS LOCAL 17 - A	08/01/2025	\$60.98	\$14.91	\$28.27	\$2.98	\$107.14
	02/01/2026	\$62.93	\$14.91	\$28.27	\$2.98	\$109.09

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (TESTING AND BALANCING -WATER)	03/01/2025	\$68.88	\$12.70	\$21.80	\$0.00	\$103.38
PIPEFITTERS LOCAL 537						

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC MECHANIC <i>PIPEFITTERS LOCAL 537</i>	03/01/2025	\$68.88	\$12.70	\$21.80	\$0.00	\$103.38
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.85	\$9.90	\$18.90	\$0.00	\$75.65
	06/01/2025	\$48.35	\$9.90	\$18.90	\$0.00	\$77.15
	12/01/2025	\$49.85	\$9.90	\$18.90	\$0.00	\$78.65
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.90	\$9.90	\$18.90	\$0.00	\$81.70
	06/01/2027	\$54.50	\$9.90	\$18.90	\$0.00	\$83.30
	12/01/2027	\$56.10	\$9.90	\$18.90	\$0.00	\$84.90
	06/01/2028	\$57.78	\$9.90	\$18.90	\$0.00	\$86.58
	12/01/2028	\$59.45	\$9.90	\$18.90	\$0.00	\$88.25
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.95	\$9.90	\$18.90	\$0.00	\$75.75
	06/01/2025	\$48.45	\$9.90	\$18.90	\$0.00	\$77.25
	12/01/2025	\$49.95	\$9.90	\$18.90	\$0.00	\$78.75
	06/01/2026	\$51.50	\$9.90	\$18.90	\$0.00	\$80.30
	12/01/2026	\$53.00	\$9.90	\$18.90	\$0.00	\$81.80
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2024	\$56.92	\$14.75	\$19.61	\$0.00	\$91.28
	09/01/2025	\$60.34	\$14.75	\$19.61	\$0.00	\$94.70
	09/01/2026	\$63.76	\$14.75	\$19.61	\$0.00	\$98.12

Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.46	\$14.75	\$14.32	\$0.00	\$57.53
2	60	\$34.15	\$14.75	\$15.37	\$0.00	\$64.27
3	70	\$39.84	\$14.75	\$16.43	\$0.00	\$71.02
4	80	\$45.54	\$14.75	\$17.49	\$0.00	\$77.78

Effective Date - 09/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.17	\$14.75	\$14.32	\$0.00	\$59.24
2	60	\$36.20	\$14.75	\$15.37	\$0.00	\$66.32
3	70	\$42.24	\$14.75	\$16.43	\$0.00	\$73.42
4	80	\$48.27	\$14.75	\$17.49	\$0.00	\$80.51

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (BOSTON AREA)</i>	03/16/2024	\$53.97	\$8.35	\$26.70	\$0.00	\$89.02
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Apprentice - IRONWORKER - Local 7 Boston

Effective Date - 03/16/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$32.38	\$8.35	\$26.70	\$0.00	\$67.43
2	70	\$37.78	\$8.35	\$26.70	\$0.00	\$72.83
3	75	\$40.48	\$8.35	\$26.70	\$0.00	\$75.53
4	80	\$43.18	\$8.35	\$26.70	\$0.00	\$78.23
5	85	\$45.87	\$8.35	\$26.70	\$0.00	\$80.92
6	90	\$48.57	\$8.35	\$26.70	\$0.00	\$83.62

Notes:

Apprentice to Journeyworker Ratio:1:4

JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 1	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						

LABORER LABORERS - ZONE 1	12/01/2024	\$46.10	\$9.90	\$18.90	\$0.00	\$74.90
	06/01/2025	\$47.60	\$9.90	\$18.90	\$0.00	\$76.40
	12/01/2025	\$49.10	\$9.90	\$18.90	\$0.00	\$77.90
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.15	\$9.90	\$18.90	\$0.00	\$80.95
	06/01/2027	\$53.75	\$9.90	\$18.90	\$0.00	\$82.55
	12/01/2027	\$55.35	\$9.90	\$18.90	\$0.00	\$84.15
	06/01/2028	\$57.03	\$9.90	\$18.90	\$0.00	\$85.83
	12/01/2028	\$58.70	\$9.90	\$18.90	\$0.00	\$87.50

Apprentice - LABORER - Zone 1

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$27.66	\$9.90	\$18.90	\$0.00	\$56.46
2	70	\$32.27	\$9.90	\$18.90	\$0.00	\$61.07
3	80	\$36.88	\$9.90	\$18.90	\$0.00	\$65.68
4	90	\$41.49	\$9.90	\$18.90	\$0.00	\$70.29

Effective Date - 06/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$28.56	\$9.90	\$18.90	\$0.00	\$57.36
2	70	\$33.32	\$9.90	\$18.90	\$0.00	\$62.12
3	80	\$38.08	\$9.90	\$18.90	\$0.00	\$66.88
4	90	\$42.84	\$9.90	\$18.90	\$0.00	\$71.64

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY)	12/01/2024	\$46.20	\$9.90	\$18.90	\$0.00	\$75.00
LABORERS - ZONE 1 (HEAVY & HIGHWAY)	06/01/2025	\$47.70	\$9.90	\$18.90	\$0.00	\$76.50
	12/01/2025	\$49.20	\$9.90	\$18.90	\$0.00	\$78.00
	06/01/2026	\$50.75	\$9.90	\$18.90	\$0.00	\$79.55
	12/01/2026	\$52.25	\$9.90	\$18.90	\$0.00	\$81.05

Apprentice - LABORER (Heavy & Highway) - Zone 1

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$27.72	\$9.90	\$18.90	\$0.00	\$56.52
2	70	\$32.34	\$9.90	\$18.90	\$0.00	\$61.14
3	80	\$36.96	\$9.90	\$18.90	\$0.00	\$65.76
4	90	\$41.58	\$9.90	\$18.90	\$0.00	\$70.38

Effective Date - 06/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$28.62	\$9.65	\$18.90	\$0.00	\$57.17
2	70	\$33.39	\$9.65	\$18.90	\$0.00	\$61.94
3	80	\$38.16	\$9.65	\$18.90	\$0.00	\$66.71
4	90	\$42.93	\$9.65	\$18.90	\$0.00	\$71.48

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.10	\$9.90	\$18.90	\$0.00	\$74.90
	06/01/2025	\$47.60	\$9.90	\$18.90	\$0.00	\$76.40
	12/01/2025	\$49.10	\$9.90	\$18.90	\$0.00	\$77.90
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.15	\$9.90	\$18.90	\$0.00	\$80.95
	06/01/2027	\$53.75	\$9.90	\$18.90	\$0.00	\$82.55
	12/01/2027	\$55.35	\$9.90	\$18.90	\$0.00	\$84.15
	06/01/2028	\$57.03	\$9.90	\$18.90	\$0.00	\$85.83
	12/01/2028	\$58.70	\$9.90	\$18.90	\$0.00	\$87.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.10	\$9.90	\$18.90	\$0.00	\$74.90
	06/01/2025	\$47.60	\$9.90	\$18.90	\$0.00	\$76.40
	12/01/2025	\$49.10	\$9.90	\$18.90	\$0.00	\$77.90
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.15	\$9.90	\$18.90	\$0.00	\$80.95
	06/01/2027	\$53.75	\$9.90	\$18.90	\$0.00	\$82.55
	12/01/2027	\$55.35	\$9.90	\$18.90	\$0.00	\$84.15
	06/01/2028	\$57.03	\$9.90	\$18.90	\$0.00	\$85.83
	12/01/2028	\$58.70	\$9.90	\$18.90	\$0.00	\$87.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 1</i>	12/02/2024	\$46.25	\$9.90	\$18.90	\$0.00	\$75.05
	06/02/2025	\$47.75	\$9.90	\$18.90	\$0.00	\$76.55
	12/01/2025	\$49.25	\$9.90	\$18.90	\$0.00	\$78.05
	06/01/2026	\$50.80	\$9.90	\$18.90	\$0.00	\$79.60
	12/07/2026	\$52.30	\$9.90	\$18.90	\$0.00	\$81.10
	06/07/2027	\$53.90	\$9.90	\$18.90	\$0.00	\$82.70
	12/06/2027	\$55.50	\$9.90	\$18.90	\$0.00	\$84.30
	06/05/2028	\$57.18	\$9.90	\$18.90	\$0.00	\$85.98
	12/04/2028	\$58.85	\$9.90	\$18.90	\$0.00	\$87.65
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.45	\$9.90	\$18.90	\$0.00	\$75.25
	06/01/2025	\$47.95	\$9.90	\$18.90	\$0.00	\$76.75
	12/01/2025	\$49.45	\$9.90	\$18.90	\$0.00	\$78.25
	06/01/2026	\$51.00	\$9.90	\$18.90	\$0.00	\$79.80
	12/01/2026	\$52.50	\$9.90	\$18.90	\$0.00	\$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.10	\$9.90	\$18.90	\$0.00	\$74.90
	06/01/2025	\$47.60	\$9.90	\$18.90	\$0.00	\$76.40
	12/01/2025	\$49.10	\$9.90	\$18.90	\$0.00	\$77.90
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.15	\$9.90	\$18.90	\$0.00	\$80.95
	06/01/2027	\$53.75	\$9.90	\$18.90	\$0.00	\$82.55
	12/01/2027	\$55.35	\$9.90	\$18.90	\$0.00	\$84.15
	06/01/2028	\$57.03	\$9.90	\$18.90	\$0.00	\$85.83
	12/01/2028	\$58.70	\$9.90	\$18.90	\$0.00	\$87.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.10	\$9.90	\$18.90	\$0.00	\$74.90
	06/01/2025	\$47.60	\$9.90	\$18.90	\$0.00	\$76.40
	12/01/2025	\$49.10	\$9.90	\$18.90	\$0.00	\$77.90
	06/01/2026	\$50.65	\$9.90	\$18.90	\$0.00	\$79.45
	12/01/2026	\$52.15	\$9.90	\$18.90	\$0.00	\$80.95
	06/01/2027	\$53.75	\$9.90	\$18.90	\$0.00	\$82.55
	12/01/2027	\$55.35	\$9.90	\$18.90	\$0.00	\$84.15
	06/01/2028	\$57.03	\$9.90	\$18.90	\$0.00	\$85.83
	12/01/2028	\$58.70	\$9.90	\$18.90	\$0.00	\$87.50
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.45	\$9.90	\$18.90	\$0.00	\$75.25
	06/01/2025	\$47.95	\$9.90	\$18.90	\$0.00	\$76.75
	12/01/2025	\$49.45	\$9.90	\$18.90	\$0.00	\$78.25
	06/01/2026	\$51.00	\$9.90	\$18.90	\$0.00	\$79.80
	12/01/2026	\$52.50	\$9.90	\$18.90	\$0.00	\$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	02/01/2025	\$50.36	\$11.49	\$21.62	\$0.00	\$83.47
	08/01/2025	\$52.08	\$11.49	\$21.62	\$0.00	\$85.19
	02/01/2026	\$53.16	\$11.49	\$21.62	\$0.00	\$86.27
	08/01/2026	\$54.92	\$11.49	\$21.62	\$0.00	\$88.03
	02/01/2027	\$56.04	\$11.49	\$21.62	\$0.00	\$89.15

Classification			Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile								
Effective Date - 02/01/2025								
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$25.18		\$11.49	\$21.62	\$0.00	\$58.29	
2	60	\$30.22		\$11.49	\$21.62	\$0.00	\$63.33	
3	70	\$35.25		\$11.49	\$21.62	\$0.00	\$68.36	
4	80	\$40.29		\$11.49	\$21.62	\$0.00	\$73.40	
5	90	\$45.32		\$11.49	\$21.62	\$0.00	\$78.43	
Effective Date - 08/01/2025								
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$26.04		\$11.49	\$21.62	\$0.00	\$59.15	
2	60	\$31.25		\$11.49	\$21.62	\$0.00	\$64.36	
3	70	\$36.46		\$11.49	\$21.62	\$0.00	\$69.57	
4	80	\$41.66		\$11.49	\$21.62	\$0.00	\$74.77	
5	90	\$46.87		\$11.49	\$21.62	\$0.00	\$79.98	
Notes:								
Apprentice to Journeyworker Ratio:1:3								
MARBLE MASONS,TILELAYERS & TERRAZZO MECH			02/01/2025	\$65.82	\$11.49	\$23.56	\$0.00	\$100.87
BRICKLAYERS LOCAL 3 - MARBLE & TILE			08/01/2025	\$67.97	\$11.49	\$23.56	\$0.00	\$103.02
			02/01/2026	\$69.32	\$11.49	\$23.56	\$0.00	\$104.37
			08/01/2026	\$71.52	\$11.49	\$23.56	\$0.00	\$106.57
			02/01/2027	\$72.92	\$11.49	\$23.56	\$0.00	\$107.97

Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.91	\$11.49	\$23.56	\$0.00	\$67.96
2	60	\$39.49	\$11.49	\$23.56	\$0.00	\$74.54
3	70	\$46.07	\$11.49	\$23.56	\$0.00	\$81.12
4	80	\$52.66	\$11.49	\$23.56	\$0.00	\$87.71
5	90	\$59.24	\$11.49	\$23.56	\$0.00	\$94.29

Effective Date - 08/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$33.99	\$11.49	\$23.56	\$0.00	\$69.04
2	60	\$40.78	\$11.49	\$23.56	\$0.00	\$75.83
3	70	\$47.58	\$11.49	\$23.56	\$0.00	\$82.63
4	80	\$54.38	\$11.49	\$23.56	\$0.00	\$89.43
5	90	\$61.17	\$11.49	\$23.56	\$0.00	\$96.22

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES)	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 1)	01/06/2025	\$50.53	\$10.08	\$21.72	\$0.00	\$82.33
MILLWRIGHTS LOCAL 1121 - Zone 1	01/05/2026	\$53.03	\$10.08	\$21.72	\$0.00	\$84.83

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - MILLWRIGHT - Local 1121 Zone 1						
Effective Date - 01/06/2025						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$27.79	\$10.08	\$5.64	\$0.00	\$43.51
2	65	\$32.84	\$10.08	\$6.66	\$0.00	\$49.58
3	75	\$37.90	\$10.08	\$19.16	\$0.00	\$67.14
4	85	\$42.95	\$10.08	\$20.18	\$0.00	\$73.21
Effective Date - 01/05/2026						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$29.17	\$10.08	\$5.64	\$0.00	\$44.89
2	65	\$34.47	\$10.08	\$6.66	\$0.00	\$51.21
3	75	\$39.77	\$10.08	\$19.16	\$0.00	\$69.01
4	85	\$45.08	\$10.08	\$20.18	\$0.00	\$75.34
<div>Notes: Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 \$5.72, Step 2 \$6.66) Steps are 2,000 hours</div>						
Apprentice to Journeyworker Ratio:1:4						
MORTAR MIXER	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
LABORERS - ZONE 1	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS)	12/01/2024	\$25.37	\$15.30	\$16.40	\$0.00	\$57.07
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$25.97	\$15.30	\$16.40	\$0.00	\$57.67
	12/01/2025	\$26.63	\$15.30	\$16.40	\$0.00	\$58.33
	06/01/2026	\$27.22	\$15.30	\$16.40	\$0.00	\$58.92
	12/01/2026	\$27.89	\$15.30	\$16.40	\$0.00	\$59.59
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS)	12/01/2024	\$31.08	\$15.30	\$16.40	\$0.00	\$62.78
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$31.80	\$15.30	\$16.40	\$0.00	\$63.50
	12/01/2025	\$32.60	\$15.30	\$16.40	\$0.00	\$64.30
	06/01/2026	\$33.32	\$15.30	\$16.40	\$0.00	\$65.02
	12/01/2026	\$34.12	\$15.30	\$16.40	\$0.00	\$65.82
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
OTHER POWER DRIVEN EQUIPMENT - CLASS II <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.23	\$9.95	\$0.00	\$0.00	\$39.18
2	55	\$32.15	\$9.95	\$6.66	\$0.00	\$48.76
3	60	\$35.08	\$9.95	\$7.26	\$0.00	\$52.29
4	65	\$38.00	\$9.95	\$7.87	\$0.00	\$55.82
5	70	\$40.92	\$9.95	\$20.32	\$0.00	\$71.19
6	75	\$43.85	\$9.95	\$20.93	\$0.00	\$74.73
7	80	\$46.77	\$9.95	\$21.53	\$0.00	\$78.25
8	90	\$52.61	\$9.95	\$22.74	\$0.00	\$85.30

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2025	\$49.36	\$9.95	\$23.95	\$0.00	\$83.26
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 2</i>						

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.68	\$9.95	\$0.00	\$0.00	\$34.63
2	55	\$27.15	\$9.95	\$6.66	\$0.00	\$43.76
3	60	\$29.62	\$9.95	\$7.26	\$0.00	\$46.83
4	65	\$32.08	\$9.95	\$7.87	\$0.00	\$49.90
5	70	\$34.55	\$9.95	\$20.32	\$0.00	\$64.82
6	75	\$37.02	\$9.95	\$20.93	\$0.00	\$67.90
7	80	\$39.49	\$9.95	\$21.53	\$0.00	\$70.97
8	90	\$44.42	\$9.95	\$22.74	\$0.00	\$77.11

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PAINTER (SPRAY OR SANDBLAST, REPAINT) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2025	\$47.42	\$9.95	\$23.95	\$0.00	\$81.32

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.71	\$9.95	\$0.00	\$0.00	\$33.66
2	55	\$26.08	\$9.95	\$6.66	\$0.00	\$42.69
3	60	\$28.45	\$9.95	\$7.26	\$0.00	\$45.66
4	65	\$30.82	\$9.95	\$7.87	\$0.00	\$48.64
5	70	\$33.19	\$9.95	\$20.32	\$0.00	\$63.46
6	75	\$35.57	\$9.95	\$20.93	\$0.00	\$66.45
7	80	\$37.94	\$9.95	\$21.53	\$0.00	\$69.42
8	90	\$42.68	\$9.95	\$22.74	\$0.00	\$75.37

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2025	\$47.96	\$9.95	\$23.95	\$0.00	\$81.86
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* If 30% or more of surfaces to be painted are new construction,
NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*

Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.98	\$9.95	\$0.00	\$0.00	\$33.93
2	55	\$26.38	\$9.95	\$6.66	\$0.00	\$42.99
3	60	\$28.78	\$9.95	\$7.26	\$0.00	\$45.99
4	65	\$31.17	\$9.95	\$7.87	\$0.00	\$48.99
5	70	\$33.57	\$9.95	\$20.32	\$0.00	\$63.84
6	75	\$35.97	\$9.95	\$20.93	\$0.00	\$66.85
7	80	\$38.37	\$9.95	\$21.53	\$0.00	\$69.85
8	90	\$43.16	\$9.95	\$22.74	\$0.00	\$75.85

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2025	\$46.02	\$9.95	\$23.95	\$0.00	\$79.92
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PAINTERS LOCAL 35 - ZONE 2

Classification		Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT							
Effective Date - 01/01/2025							
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$23.01	\$9.95	\$0.00	\$0.00	\$32.96	
2	55	\$25.31	\$9.95	\$6.66	\$0.00	\$41.92	
3	60	\$27.61	\$9.95	\$7.26	\$0.00	\$44.82	
4	65	\$29.91	\$9.95	\$7.87	\$0.00	\$47.73	
5	70	\$32.21	\$9.95	\$20.32	\$0.00	\$62.48	
6	75	\$34.52	\$9.95	\$20.93	\$0.00	\$65.40	
7	80	\$36.82	\$9.95	\$21.53	\$0.00	\$68.30	
8	90	\$41.42	\$9.95	\$22.74	\$0.00	\$74.11	
<div>Notes:</div> <div>Steps are 750 hrs.</div>							
Apprentice to Journeyworker Ratio:1:1							
PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY)		12/01/2024	\$46.20	\$9.90	\$18.90	\$0.00	\$75.00
LABORERS - ZONE 1 (HEAVY & HIGHWAY)		06/01/2025	\$47.70	\$9.90	\$18.90	\$0.00	\$76.50
		12/01/2025	\$49.20	\$9.90	\$18.90	\$0.00	\$78.00
		06/01/2026	\$50.75	\$9.90	\$18.90	\$0.00	\$79.55
		12/01/2026	\$52.25	\$9.90	\$18.90	\$0.00	\$81.05
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)							
PANEL & PICKUP TRUCKS DRIVER		12/01/2024	\$40.88	\$14.91	\$20.17	\$0.00	\$75.96
TEAMSTERS JOINT COUNCIL NO. 10 ZONE A		06/01/2025	\$41.88	\$14.91	\$20.17	\$0.00	\$76.96
		08/01/2025	\$41.88	\$15.41	\$20.17	\$0.00	\$77.46
		12/01/2025	\$41.88	\$15.41	\$21.78	\$0.00	\$79.07
		06/01/2026	\$42.88	\$15.41	\$21.78	\$0.00	\$80.07
		08/01/2026	\$42.88	\$15.91	\$21.78	\$0.00	\$80.57
		12/01/2026	\$42.88	\$15.91	\$23.52	\$0.00	\$82.31
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)		08/01/2024	\$55.79	\$10.08	\$24.29	\$0.00	\$90.16
PILE DRIVER LOCAL 56 (ZONE 1)							
For apprentice rates see "Apprentice- PILE DRIVER"							
PILE DRIVER		08/01/2024	\$55.79	\$10.08	\$24.29	\$0.00	\$90.16
PILE DRIVER LOCAL 56 (ZONE 1)							

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - PILE DRIVER - Local 56 Zone 1						
Effective Date - 08/01/2024						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$25.11	\$10.08	\$2.53	\$0.00	\$37.72
2	55	\$30.68	\$10.08	\$5.07	\$0.00	\$45.83
3	70	\$39.05	\$10.08	\$19.22	\$0.00	\$68.35
4	80	\$44.63	\$10.08	\$21.76	\$0.00	\$76.47
Notes: % Indentured BEFORE 8/1/20; 50/60/70/75/80/80/90/90 Apprentice to Journeyworker Ratio: 1:2 \$62.27/ 3 \$67.84/ 4 \$73.42/ 5 \$76.21/ 6 \$79.00/ 7 & 8 \$84.58						
PIPEFITTER & STEAMFITTER	03/01/2025	\$68.88	\$12.70	\$21.80	\$0.00	\$103.38
PIPEFITTERS LOCAL 537						

Apprentice - PIPEFITTER - Local 537

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$27.55	\$12.70	\$9.05	\$0.00	\$49.30
2	45	\$31.00	\$12.70	\$21.80	\$0.00	\$65.50
3	60	\$41.33	\$12.70	\$21.80	\$0.00	\$75.83
4	70	\$48.22	\$12.70	\$21.80	\$0.00	\$82.72
5	80	\$55.10	\$12.70	\$21.80	\$0.00	\$89.60
Notes: ** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr. Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max) Apprentice to Journeyworker Ratio:**						

PIPELAYER	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
LABORERS - ZONE 1	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY)	12/01/2024	\$46.45	\$9.90	\$18.90	\$0.00	\$75.25
LABORERS - ZONE 1 (HEAVY & HIGHWAY)	06/01/2025	\$47.95	\$9.90	\$18.90	\$0.00	\$76.75
	12/01/2025	\$49.45	\$9.90	\$18.90	\$0.00	\$78.25
	06/01/2026	\$51.00	\$9.90	\$18.90	\$0.00	\$79.80
	12/01/2026	\$52.50	\$9.90	\$18.90	\$0.00	\$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PLUMBERS & GASFITTERS <i>PLUMBERS & GASFITTERS LOCAL 12</i>	03/02/2025	\$69.84	\$14.32	\$20.31	\$0.00	\$104.47
Apprentice - PLUMBER/GASFITTER - Local 12						
Effective Date - 03/02/2025						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$24.44	\$14.32	\$7.41	\$0.00	\$46.17
2	40	\$27.94	\$14.32	\$8.42	\$0.00	\$50.68
3	55	\$38.41	\$14.32	\$11.47	\$0.00	\$64.20
4	65	\$45.40	\$14.32	\$13.50	\$0.00	\$73.22
5	75	\$52.38	\$14.32	\$15.53	\$0.00	\$82.23
Notes: ** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr Step4 with lic\$76.49 tot.rate, Step5 with lic. \$85.32 tot. rate						
Apprentice to Journeyworker Ratio:**						
PNEUMATIC CONTROLS (TEMP.) <i>PIPEFITTERS LOCAL 537</i>	03/01/2025	\$68.88	\$12.70	\$21.80	\$0.00	\$103.38
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.45	\$9.90	\$18.90	\$0.00	\$75.25
	06/01/2025	\$47.95	\$9.90	\$18.90	\$0.00	\$76.75
	12/01/2025	\$49.45	\$9.90	\$18.90	\$0.00	\$78.25
	06/01/2026	\$51.00	\$9.90	\$18.90	\$0.00	\$79.80
	12/01/2026	\$52.50	\$9.90	\$18.90	\$0.00	\$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER <i>LABORERS - ZONE 1</i>	12/01/2024	\$47.10	\$9.90	\$18.90	\$0.00	\$75.90
	06/01/2025	\$48.60	\$9.90	\$18.90	\$0.00	\$77.40
	12/01/2025	\$50.10	\$9.90	\$18.90	\$0.00	\$78.90
	06/01/2026	\$51.65	\$9.90	\$18.90	\$0.00	\$80.45
	12/01/2026	\$53.15	\$9.90	\$18.90	\$0.00	\$81.95
	06/01/2027	\$54.75	\$9.90	\$18.90	\$0.00	\$83.55
	12/01/2027	\$56.35	\$9.90	\$18.90	\$0.00	\$85.15
	06/01/2028	\$58.03	\$9.90	\$18.90	\$0.00	\$86.83
	12/01/2028	\$59.70	\$9.90	\$18.90	\$0.00	\$88.50
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWDERMAN & BLASTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$47.20	\$9.90	\$18.90	\$0.00	\$76.00
	06/01/2025	\$48.70	\$9.90	\$18.90	\$0.00	\$77.50
	12/01/2025	\$50.20	\$9.90	\$18.90	\$0.00	\$79.00
	06/01/2026	\$51.75	\$9.90	\$18.90	\$0.00	\$80.55
	12/01/2026	\$53.25	\$9.90	\$18.90	\$0.00	\$82.05
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$36.67	\$15.55	\$16.50	\$0.00	\$68.72
	06/01/2025	\$37.52	\$15.55	\$16.50	\$0.00	\$69.57
	12/01/2025	\$38.47	\$15.55	\$16.50	\$0.00	\$70.52
	06/01/2026	\$39.33	\$15.55	\$16.50	\$0.00	\$71.38
	12/01/2026	\$40.28	\$15.55	\$16.50	\$0.00	\$72.33
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS 653 - Southeastern Concrete (Weymouth)</i>	08/01/2023	\$25.00	\$13.91	\$6.90	\$0.00	\$45.81
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofers Waterproofing &Roofers Damproofg) <i>ROOFERS LOCAL 33</i>	02/01/2025	\$52.03	\$13.28	\$21.70	\$0.00	\$87.01
	08/01/2025	\$53.53	\$13.28	\$21.70	\$0.00	\$88.51
	02/01/2026	\$54.78	\$13.28	\$21.70	\$0.00	\$89.76

Apprentice - ROOFER - Local 33

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.02	\$13.28	\$15.55	\$0.00	\$54.85
2	60	\$31.22	\$13.28	\$21.70	\$0.00	\$66.20
3	65	\$33.82	\$13.28	\$21.70	\$0.00	\$68.80
4	75	\$39.02	\$13.28	\$21.70	\$0.00	\$74.00
5	85	\$44.23	\$13.28	\$21.70	\$0.00	\$79.21

Effective Date - 08/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.77	\$13.28	\$15.55	\$0.00	\$55.60
2	60	\$32.12	\$13.28	\$21.70	\$0.00	\$67.10
3	65	\$34.79	\$13.28	\$21.70	\$0.00	\$69.77
4	75	\$40.15	\$13.28	\$21.70	\$0.00	\$75.13
5	85	\$45.50	\$13.28	\$21.70	\$0.00	\$80.48

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.
(Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE <i>ROOFERS LOCAL 33</i>	02/01/2025	\$52.28	\$13.28	\$21.70	\$0.00	\$87.26
	08/01/2025	\$53.78	\$13.28	\$21.70	\$0.00	\$88.76
	02/01/2026	\$55.03	\$13.28	\$21.70	\$0.00	\$90.01

For apprentice rates see "Apprentice- ROOFER"

SHEETMETAL WORKER <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	02/01/2025	\$59.13	\$14.91	\$28.27	\$2.98	\$105.29
	08/01/2025	\$60.98	\$14.91	\$28.27	\$2.98	\$107.14
	02/01/2026	\$62.93	\$14.91	\$28.27	\$2.98	\$109.09

Apprentice - SHEET METAL WORKER - Local 17-A

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$24.83	\$14.91	\$6.13	\$0.00	\$45.87
2	42	\$24.83	\$14.91	\$6.13	\$0.00	\$45.87
3	47	\$27.79	\$14.91	\$12.26	\$1.62	\$56.58
4	47	\$27.79	\$14.91	\$12.26	\$1.62	\$56.58
5	52	\$30.75	\$14.91	\$13.24	\$1.74	\$60.64
6	52	\$30.75	\$14.91	\$13.49	\$1.75	\$60.90
7	60	\$35.48	\$14.91	\$14.90	\$1.93	\$67.22
8	65	\$38.43	\$14.91	\$15.88	\$2.04	\$71.26
9	75	\$44.35	\$14.91	\$17.84	\$2.28	\$79.38
10	85	\$50.26	\$14.91	\$19.30	\$2.49	\$86.96

Effective Date - 08/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$25.61	\$14.91	\$6.13	\$0.00	\$46.65
2	42	\$25.61	\$14.91	\$6.13	\$0.00	\$46.65
3	47	\$28.66	\$14.91	\$12.26	\$1.62	\$57.45
4	47	\$28.66	\$14.91	\$12.26	\$1.62	\$57.45
5	52	\$31.71	\$14.91	\$13.24	\$1.74	\$61.60
6	52	\$31.71	\$14.91	\$13.49	\$1.75	\$61.86
7	60	\$36.59	\$14.91	\$14.90	\$1.93	\$68.33
8	65	\$39.64	\$14.91	\$15.88	\$2.04	\$72.47
9	75	\$45.74	\$14.91	\$17.84	\$2.28	\$80.77
10	85	\$51.83	\$14.91	\$19.30	\$2.49	\$88.53

Notes:

Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SPECIALIZED EARTH MOVING EQUIP < 35 TONS	12/01/2024	\$41.34	\$14.91	\$20.17	\$0.00	\$76.42
TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	06/01/2025	\$42.34	\$14.91	\$20.17	\$0.00	\$77.42
	08/01/2025	\$42.34	\$15.41	\$20.17	\$0.00	\$77.92
	12/01/2025	\$42.34	\$15.41	\$21.78	\$0.00	\$79.53
	06/01/2026	\$43.34	\$15.41	\$21.78	\$0.00	\$80.53
	08/01/2026	\$43.34	\$15.91	\$21.78	\$0.00	\$81.03
	12/01/2026	\$43.34	\$15.91	\$23.52	\$0.00	\$82.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2024	\$41.63	\$14.91	\$20.17	\$0.00	\$76.71
	06/01/2025	\$42.63	\$14.91	\$20.17	\$0.00	\$77.71
	08/01/2025	\$42.63	\$15.41	\$20.17	\$0.00	\$78.21
	12/01/2025	\$42.63	\$15.41	\$21.78	\$0.00	\$79.82
	06/01/2026	\$43.63	\$15.41	\$21.78	\$0.00	\$80.82
	08/01/2026	\$43.63	\$15.91	\$21.78	\$0.00	\$81.32
	12/01/2026	\$43.63	\$15.91	\$23.52	\$0.00	\$83.06
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1</i>	03/01/2025	\$72.14	\$11.51	\$23.80	\$0.00	\$107.45

Apprentice - SPRINKLER FITTER - Local 550 (Section A) Zone 1

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$25.25	\$11.51	\$13.07	\$0.00	\$49.83
2	40	\$28.86	\$11.51	\$13.90	\$0.00	\$54.27
3	45	\$32.46	\$11.51	\$14.73	\$0.00	\$58.70
4	50	\$36.07	\$11.51	\$15.55	\$0.00	\$63.13
5	55	\$39.68	\$11.51	\$16.37	\$0.00	\$67.56
6	60	\$43.28	\$11.51	\$17.20	\$0.00	\$71.99
7	65	\$46.89	\$11.51	\$18.03	\$0.00	\$76.43
8	70	\$50.50	\$11.51	\$18.85	\$0.00	\$80.86
9	75	\$54.11	\$11.51	\$19.67	\$0.00	\$85.29
10	80	\$57.71	\$11.51	\$20.50	\$0.00	\$89.72

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2025	\$51.41	\$13.00	\$20.90	\$0.00	\$85.31
	09/01/2025	\$52.94	\$13.00	\$20.95	\$0.00	\$86.89
	03/01/2026	\$53.90	\$13.00	\$20.98	\$0.00	\$87.88
	09/01/2026	\$55.42	\$13.00	\$21.02	\$0.00	\$89.44
	03/01/2027	\$56.38	\$13.00	\$21.05	\$0.00	\$90.43
	09/01/2027	\$57.91	\$13.00	\$21.10	\$0.00	\$92.01
	03/01/2028	\$58.87	\$13.00	\$21.13	\$0.00	\$93.00

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 103

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$23.13	\$13.00	\$0.69	\$0.00	\$36.82
2	45	\$23.13	\$13.00	\$0.69	\$0.00	\$36.82
3	50	\$25.71	\$13.00	\$16.64	\$0.00	\$55.35
4	50	\$25.71	\$13.00	\$16.64	\$0.00	\$55.35
5	55	\$28.28	\$13.00	\$17.07	\$0.00	\$58.35
6	60	\$30.85	\$13.00	\$17.50	\$0.00	\$61.35
7	65	\$33.42	\$13.00	\$17.92	\$0.00	\$64.34
8	70	\$35.99	\$13.00	\$18.35	\$0.00	\$67.34
9	75	\$38.56	\$13.00	\$18.78	\$0.00	\$70.34
10	80	\$41.13	\$13.00	\$19.19	\$0.00	\$73.32

Effective Date - 09/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$23.82	\$13.00	\$0.71	\$0.00	\$37.53
2	45	\$23.82	\$13.00	\$0.71	\$0.00	\$37.53
3	50	\$26.47	\$13.00	\$16.66	\$0.00	\$56.13
4	50	\$26.47	\$13.00	\$16.66	\$0.00	\$56.13
5	55	\$29.12	\$13.00	\$17.09	\$0.00	\$59.21
6	60	\$31.76	\$13.00	\$17.52	\$0.00	\$62.28
7	65	\$34.41	\$13.00	\$17.95	\$0.00	\$65.36
8	70	\$37.06	\$13.00	\$18.38	\$0.00	\$68.44
9	75	\$39.71	\$13.00	\$18.81	\$0.00	\$71.52
10	80	\$42.35	\$13.00	\$19.23	\$0.00	\$74.58

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	02/01/2025	\$64.74	\$11.49	\$23.59	\$0.00	\$99.82
	08/01/2025	\$66.89	\$11.49	\$23.59	\$0.00	\$101.97
	02/01/2026	\$68.24	\$11.49	\$23.59	\$0.00	\$103.32
	08/01/2026	\$70.44	\$11.49	\$23.59	\$0.00	\$105.52
	02/01/2027	\$71.84	\$11.49	\$23.59	\$0.00	\$106.92

Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.37	\$11.49	\$23.59	\$0.00	\$67.45
2	60	\$38.84	\$11.49	\$23.59	\$0.00	\$73.92
3	70	\$45.32	\$11.49	\$23.59	\$0.00	\$80.40
4	80	\$51.79	\$11.49	\$23.59	\$0.00	\$86.87
5	90	\$58.27	\$11.49	\$23.59	\$0.00	\$93.35

Effective Date - 08/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$33.45	\$11.49	\$23.59	\$0.00	\$68.53
2	60	\$40.13	\$11.49	\$23.59	\$0.00	\$75.21
3	70	\$46.82	\$11.49	\$23.59	\$0.00	\$81.90
4	80	\$53.51	\$11.49	\$23.59	\$0.00	\$88.59
5	90	\$60.20	\$11.49	\$23.59	\$0.00	\$95.28

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER	12/01/2024	\$50.20	\$9.90	\$19.05	\$0.00	\$79.15
LABORERS - FOUNDATION AND MARINE	06/01/2025	\$51.70	\$9.90	\$19.05	\$0.00	\$80.65
	12/01/2025	\$53.20	\$9.90	\$19.05	\$0.00	\$82.15
	06/01/2026	\$54.75	\$9.90	\$19.05	\$0.00	\$83.70
	12/01/2026	\$56.25	\$9.90	\$19.05	\$0.00	\$85.20
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER	12/01/2024	\$46.32	\$9.90	\$19.05	\$0.00	\$75.27
LABORERS - FOUNDATION AND MARINE	06/01/2025	\$47.82	\$9.90	\$19.05	\$0.00	\$76.77
	12/01/2025	\$49.32	\$9.90	\$19.05	\$0.00	\$78.27
	06/01/2026	\$50.87	\$9.90	\$19.05	\$0.00	\$79.82
	12/01/2026	\$52.37	\$9.90	\$19.05	\$0.00	\$81.32
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER	12/01/2024	\$46.20	\$9.90	\$19.05	\$0.00	\$75.15
LABORERS - FOUNDATION AND MARINE	06/01/2025	\$47.70	\$9.90	\$19.05	\$0.00	\$76.65
	12/01/2025	\$49.20	\$9.90	\$19.05	\$0.00	\$78.15
	06/01/2026	\$50.75	\$9.90	\$19.05	\$0.00	\$79.70
	12/01/2026	\$52.25	\$9.90	\$19.05	\$0.00	\$81.20
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS	12/01/2024	\$56.40	\$15.55	\$16.50	\$0.00	\$88.45
OPERATING ENGINEERS LOCAL 4	06/01/2025	\$57.68	\$15.55	\$16.50	\$0.00	\$89.73
	12/01/2025	\$59.12	\$15.55	\$16.50	\$0.00	\$91.17
	06/01/2026	\$60.40	\$15.55	\$16.50	\$0.00	\$92.45
	12/01/2026	\$61.84	\$15.55	\$16.50	\$0.00	\$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2024	\$41.92	\$14.91	\$20.17	\$0.00	\$77.00
	06/01/2025	\$42.92	\$14.91	\$20.17	\$0.00	\$78.00
	08/01/2025	\$42.92	\$15.41	\$20.17	\$0.00	\$78.50
	12/01/2025	\$42.92	\$15.41	\$21.78	\$0.00	\$80.11
	06/01/2026	\$43.92	\$15.41	\$21.78	\$0.00	\$81.11
	08/01/2026	\$43.92	\$15.91	\$21.78	\$0.00	\$81.61
	12/01/2026	\$43.92	\$15.91	\$23.52	\$0.00	\$83.35
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2024	\$58.43	\$9.90	\$19.50	\$0.00	\$87.83
	06/01/2025	\$59.93	\$9.90	\$19.50	\$0.00	\$89.33
	12/01/2025	\$61.43	\$9.90	\$19.50	\$0.00	\$90.83
	06/01/2026	\$62.98	\$9.90	\$19.50	\$0.00	\$92.38
	12/01/2026	\$64.48	\$9.90	\$19.50	\$0.00	\$93.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2024	\$60.43	\$9.90	\$19.50	\$0.00	\$89.83
	06/01/2025	\$61.93	\$9.90	\$19.50	\$0.00	\$91.33
	12/01/2025	\$63.43	\$9.90	\$19.50	\$0.00	\$92.83
	06/01/2026	\$64.98	\$9.90	\$19.50	\$0.00	\$94.38
	12/01/2026	\$66.48	\$9.90	\$19.50	\$0.00	\$95.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2024	\$50.50	\$9.90	\$19.50	\$0.00	\$79.90
	06/01/2025	\$52.00	\$9.90	\$19.50	\$0.00	\$81.40
	12/01/2025	\$53.50	\$9.90	\$19.50	\$0.00	\$82.90
	06/01/2026	\$55.05	\$9.90	\$19.50	\$0.00	\$84.45
	12/01/2026	\$56.55	\$9.90	\$19.50	\$0.00	\$85.95
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2024	\$52.50	\$9.90	\$19.50	\$0.00	\$81.90
	06/01/2025	\$54.00	\$9.90	\$19.50	\$0.00	\$83.40
	12/01/2025	\$55.50	\$9.90	\$19.50	\$0.00	\$84.90
	06/01/2026	\$57.05	\$9.90	\$19.50	\$0.00	\$86.45
	12/01/2026	\$58.55	\$9.90	\$19.50	\$0.00	\$87.95
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2024	\$41.34	\$14.91	\$20.17	\$0.00	\$76.42
	06/01/2025	\$42.34	\$14.91	\$20.17	\$0.00	\$77.42
	08/01/2025	\$42.34	\$15.41	\$20.17	\$0.00	\$77.92
	12/01/2025	\$42.34	\$15.41	\$21.78	\$0.00	\$79.53
	06/01/2026	\$43.34	\$15.41	\$21.78	\$0.00	\$80.53
	08/01/2026	\$43.34	\$15.91	\$21.78	\$0.00	\$81.03
	12/01/2026	\$43.34	\$15.91	\$23.52	\$0.00	\$82.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WAGON DRILL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2024	\$46.35	\$9.90	\$18.90	\$0.00	\$75.15
	06/01/2025	\$47.85	\$9.90	\$18.90	\$0.00	\$76.65
	12/01/2025	\$49.35	\$9.90	\$18.90	\$0.00	\$78.15
	06/01/2026	\$50.90	\$9.90	\$18.90	\$0.00	\$79.70
	12/01/2026	\$52.40	\$9.90	\$18.90	\$0.00	\$81.20
	06/01/2027	\$54.00	\$9.90	\$18.90	\$0.00	\$82.80
	12/01/2027	\$55.60	\$9.90	\$18.90	\$0.00	\$84.40
	06/01/2028	\$57.28	\$9.90	\$18.90	\$0.00	\$86.08
	12/01/2028	\$58.95	\$9.90	\$18.90	\$0.00	\$87.75
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY & HIGHWAY)</i>	12/01/2024	\$46.45	\$9.90	\$18.90	\$0.00	\$75.25
	06/01/2025	\$47.95	\$9.90	\$18.90	\$0.00	\$76.75
	12/01/2025	\$49.45	\$9.90	\$18.90	\$0.00	\$78.25
	06/01/2026	\$51.00	\$9.90	\$18.90	\$0.00	\$79.80
	12/01/2026	\$52.50	\$9.90	\$18.90	\$0.00	\$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2024	\$57.03	\$15.55	\$16.50	\$0.00	\$89.08
	06/01/2025	\$58.33	\$15.55	\$16.50	\$0.00	\$90.38
	12/01/2025	\$59.78	\$15.55	\$16.50	\$0.00	\$91.83
	06/01/2026	\$61.08	\$15.55	\$16.50	\$0.00	\$93.13
	12/01/2026	\$62.53	\$15.55	\$16.50	\$0.00	\$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS & GASFITTERS LOCAL 12</i>	03/02/2025	\$69.84	\$14.32	\$20.31	\$0.00	\$104.47
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Additional Apprentice Information:

All apprentices must be registered with the Division of Apprenticeship Training (DAS) in accordance with M.G.L. c. 23, §§ 11E-11L. Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the hourly prevailing wage rate established by the Commissioner under the provisions of M.G.L. c. 149, §§ 26-27D. Apprentice ratios are established by DAS pursuant to M.G.L. c. 23, §§ 11E-11L. Ratios are expressed as the allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified. The ratios listed herein have been taken from relevant private collective bargaining agreements (CBAs) and are provided for illustrative purposes only. They have not been independently verified as being accurate or continuing to be accurate. Parties having questions regarding what ratio to use should contact DAS.

APPENDIX C

Sections of Massachusetts General Laws (MGL)

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39F. Construction contracts; assignment and subrogation; subcontractor defined; enforcement of claim for direct payment; deposit, reduction of disputed amounts

Section 39F. (1) Every contract awarded pursuant to sections forty-four A to L, inclusive, of chapter one hundred and forty-nine shall contain the following subparagraphs (a) through (i) and every contract awarded pursuant to section thirty-nine M of chapter thirty shall contain the following subparagraphs (a) through (h) and in each case those subparagraphs shall be binding between the general contractor and each subcontractor.

(a) Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(b) Not later than the sixty-fifth day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(c) Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor; and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

(d) If, within seventy days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the

subcontractor may demand direct payment of that balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the subcontractor has substantially completed the subcontract work. Within ten days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.

(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided, that the awarding authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general contractor and the subcontractor or as determined by decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors.

All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of such payment.

(h) The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor.

(i) If the subcontractor does not receive payment as provided in subparagraph (a) or if the general contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the subcontractor and the subcontractor does not receive payment for same when due less the deductions provided for in subparagraph (a), the subcontractor may demand direct payment by following the procedure in subparagraph (d) and the general contractor may file a sworn reply as provided in that same subparagraph. A demand made after the first day of the month following that for which the subcontractor performed or furnished the labor and materials for which the subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the general contractor. Thereafter the awarding authority shall proceed as provided in subparagraph (e), (f), (g) and (h).

(2) Any assignment by a subcontractor of the rights under this section to a surety company furnishing a bond under the provisions of section twenty-nine of chapter one hundred forty-nine shall be invalid. The assignment and subrogation rights of the surety to amounts included in a demand for direct payment which are in the possession of the awarding authority or which are on deposit pursuant to subparagraph (f) of paragraph (1) shall be subordinate to the rights of all subcontractors who are entitled to be paid under this section and who have not been paid in full.

(3) "Subcontractor" as used in this section (i) for contracts awarded as provided in sections forty-four A to forty-four H, inclusive, of chapter one hundred forty-nine shall mean a person who files a sub-bid and receives a subcontract as a result of that filed sub-bid or who is approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, (ii) for contracts awarded as provided in paragraph (a) of section thirty-nine M of chapter thirty shall mean a person approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, and (iii) for contracts with the commonwealth not awarded as provided in forty-four A to forty-four H, inclusive, of chapter one hundred forty-nine shall also mean a person contracting with the general contractor to supply materials used or employed in a public works project for a price in excess of five thousand dollars.

(4) A general contractor or a subcontractor shall enforce a claim to any portion of the amount of a demand for direct payment deposited as provided in subparagraph (f) of

paragraph 1 by a petition in equity in the superior court against the other and the bank shall not be a necessary party. A subcontractor shall enforce a claim for direct payment or a right to require a deposit as provided in subparagraph (f) of paragraph 1 by a petition in equity in the superior court against the awarding authority and the general contractor shall not be a necessary party. Upon motion of any party the court shall advance for speedy trial any petition filed as provided in this paragraph. Sections fifty-nine and fifty-nine B of chapter two hundred thirty-one shall apply to such petitions. The court shall enter an interlocutory decree upon which execution shall issue for any part of a claim found due pursuant to sections fifty-nine and fifty-nine B and, upon motion of any party, shall advance for speedy trial the petition to collect the remainder of the claim. Any party aggrieved by such interlocutory decree shall have the right to appeal therefrom as from a final decree. The court shall not consolidate for trial the petition of any subcontractor with the petition of one or more subcontractors or the same general contract unless the court finds that a substantial portion of the evidence of the same events during the course of construction (other than the fact that the claims sought to be consolidated arise under the same general contract) is applicable to the petitions sought to be consolidated and that such consolidation will prevent unnecessary duplication of evidence. A decree in any such proceeding shall not include interest on the disputed amount deposited in excess of the interest earned for the period of any such deposit. No person except a subcontractor filing a demand for direct payment for which no funds due the general contractor are available for direct payment shall have a right to file a petition in court of equity against the awarding authority claiming a demand for direct payment is premature and such subcontractor must file the petition before the awarding authority has made a direct payment to the subcontractor and has made a deposit of the disputed portion as provided in part (iii) of subparagraph (e) and in subparagraph (f) of paragraph (1).

(5) In any petition to collect any claim for which a subcontractor has filed a demand for direct payment the court shall, upon motion of the general contractor, reduce by the amount of any deposit of a disputed amount by the awarding authority as provided in part (iii) of subparagraph (e) and in subparagraph (f) of paragraph (1) any amount held under a trustee writ or pursuant to a restraining order or injunction.

Chapter 30: Section 39K. Public building construction contracts; payments

Section 39K. Every contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building by the commonwealth, or by any county, city, town, district, board, commission or other public body, when the amount is more than five thousand dollars in the case of the commonwealth and more than two thousand dollars in the case of any county, city, town, district, board, commission or other public body, shall contain the following paragraph:— Within fifteen days (30 days in the case of the commonwealth, including local housing authorities) after receipt from the contractor, at the place designated by the awarding authority if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the awarding authority will make a periodic payment to the contractor for the work

performed during the preceding month and for the materials not incorporated in the work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the contractor has title or to which a subcontractor has title and has authorized the contractor to transfer title to the awarding authority, upon certification by the contractor that he is the lawful owner and that the materials are free from all encumbrances, but less (1) a retention based on its estimate of the fair value of its claims against the contractor and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, and less (3) a retention not exceeding five per cent of the approved amount of the periodic payment. After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the contractor fully completes the work or substantially completes the work so that the value of the work remaining to be done is, in the estimate of the awarding authority, less than one per cent of the original contract price, or (b) the contractor substantially completes the work and the awarding authority takes possession for occupancy, whichever occurs first, the awarding authority shall pay the contractor the entire balance due on the contract less (1) a retention based on its estimate of the fair value of its claims against the contractor and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, or based on the record of payments by the contractor to the subcontractors under this contract if such record of payment indicates that the contractor has not paid subcontractors as provided in section thirty-nine F. If the awarding authority fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of three percentage points above the rediscount rate than charged by the Federal Reserve Bank of Boston commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the contractor; provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for final payment until fifteen days (twenty-four days in the case of the commonwealth) after receipt of such a periodic estimate from the contractor, at the place designated by the awarding authority if such a place is so designated. The contractor agrees to pay to each subcontractor a portion of any such interest paid in accordance with the amount due each subcontractor.

The awarding authority may make changes in any periodic estimate submitted by the contractor and the payment due on said periodic estimate shall be computed in accordance with the changes so made, but such changes or any requirement for a corrected periodic estimate shall not affect the due date for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment computed in accordance with the changes made, as provided herein; provided, that the awarding authority may, within seven days after receipt, return to the contractor for correction, any periodic estimate which is not in the required form or which contains computations not arithmetically correct and, in that event, the date of receipt of such periodic estimate shall be the date of receipt of the corrected periodic estimate in proper form and with arithmetically correct computations. The date of receipt of a periodic estimate received on a Saturday shall be the first working day thereafter. The provisions of section thirty-nine G shall not apply to any contract for the construction,

reconstruction, alteration, remodeling, repair or demolition of any public building to which this section applies.

All periodic estimates shall be submitted to the awarding authority, or to its designee as set forth in writing to the contractor, and the date of receipt by the awarding authority or its designee shall be marked on the estimate. All periodic estimates shall contain a separate item for each filed subtrade and each sub-subtrade listed in sub-bid form as required by specifications and a column listing the amount paid to each subcontractor and sub-subcontractor as of the date the periodic estimate is filed. The person making payment for the awarding authority shall add the daily interest provided for herein to each payment for each day beyond the due date based on the date of receipt marked on the estimate.

A certificate of the architect to the effect that the contractor has fully or substantially completed the work shall, subject to the provisions of section thirty-nine J, be conclusive for the purposes of this section.

Notwithstanding the provisions of this section, at any time after the value of the work remaining to be done is, in the estimation of the awarding authority, less than 1 per cent of the adjusted contract price, or the awarding authority has determined that the contractor has substantially completed the work and the awarding authority has taken possession for occupancy, the awarding authority may send to the general contractor by certified mail, return receipt requested, a complete and final list of all incomplete and unsatisfactory work items, including, for each item on the list, a good faith estimate of the fair and reasonable cost of completing such item. The general contractor shall then complete all such work items within 30 days of receipt of such list or before the contract completion date, whichever is later. If the general contractor fails to complete all incomplete and unsatisfactory work items within 45 days after receipt of such items furnished by the awarding authority or before the contract completion date, whichever is later, subsequent to an additional 14 days' written notice to the general contractor by certified mail, return receipt requested, the awarding authority may terminate the contract and complete the incomplete and unsatisfactory work items and charge the cost of same to the general contractor and such termination shall be without prejudice to any other rights or remedies the awarding authority may have under the contract. The awarding authority shall note any such termination in the evaluation form to be filed by the awarding authority pursuant to the provisions of section 44D of chapter 149.

Chapter 30: Section 39N. Construction contracts; equitable adjustment in contract price for differing subsurface or latent physical conditions

Section 39N. Every contract subject to section forty-four A of chapter one hundred and forty-nine or subject to section thirty-nine M of chapter thirty shall contain the following paragraph in its entirety and an awarding authority may adopt reasonable rules or

regulations in conformity with that paragraph concerning the filing, investigation and settlement of such claims:

If, during the progress of the work, the contractor or the awarding authority discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the contract documents either the contractor or the contracting authority may request an equitable adjustment in the contract price of the contract applying to work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a contractor, or upon its own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the contract documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the plans and contract documents and are of such a nature as to cause an increase or decrease in the cost of performance of the work or a change in the construction methods required for the performance of the work which results in an increase or decrease in the cost of the work, the contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly.

Chapter 30: Section 39O. Contracts for construction and materials; suspension, delay or interruption due to order of awarding authority; adjustment in contract price; written claim

Section 39O. Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety and, in the event a suspension, delay, interruption or failure to act of the awarding authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the general contractor for payment for an increase in the cost of his performance as provisions (a) and (b) give the general contractor against the awarding authority, but nothing in provisions (a) and (b) shall in any way change, modify or alter any other rights which the general contractor or the subcontractor may have against each other.

(a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act

to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.

(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act or failure to act involved in the claim.

APPENDIX D

Order of Conditions



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 SE 081-1313
 MassDEP File #

eDEP Transaction #
 Weymouth
 City/Town

A. General Information

Please note:
 this form has
 been modified
 with added
 space to
 accommodate
 the Registry
 of Deeds
 Requirements

Important:
 When filling
 out forms on
 the
 computer,
 use only the
 tab key to
 move your
 cursor - do
 not use the
 return key.



1. From: Weymouth
Conservation Commission

2. This issuance is for (check one):
 a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

Kenan

a. First Name

Connell

b. Last Name

Town of Weymouth DPW

c. Organization

120 Winter Street

d. Mailing Address

Weymouth

e. City/Town

MA

f. State

02188

g. Zip Code

4. Property Owner (if different from applicant):

a. First Name

b. Last Name

c. Organization

d. Mailing Address

e. City/Town

f. State

g. Zip Code

5. Project Location:

DPW sewer easement Montcalm St to
Commercial St

Map 13

c. Assessors Map/Plat Number

Latitude and Longitude, if known:

Weymouth

b. City/Town

131-8; 155-28; 156-5,28,38,53

d. Parcel/Lot Number

d. Latitude

d

m

s

e. Longitude

d

m

s



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

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A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):
Norfolk NA
 a. County b. Certificate Number (if registered land)
NA NA
 c. Book d. Page
7. Dates: 01/11/2024 02/27/2024 03/14/2024
 a. Date Notice of Intent Filed b. Date Public Hearing Closed c. Date of Issuance
8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):
Lower Central Inceptor Improvements Town of Weymouth, MA
 a. Plan Title
Environmental Partners Ryan Allgrove, PE
 b. Prepared By c. Signed and Stamped by
January 2024 1"=20'
 d. Final Revision Date e. Scale
 f. Additional Plan or Document Title g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:
- Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:
- a. ☐ Public Water Supply b. ☐ Land Containing Shellfish c. ☒ Prevention of Pollution
 d. ☐ Private Water Supply e. ☒ Fisheries f. ☒ Protection of Wildlife Habitat
 g. ☐ Groundwater Supply h. ☒ Storm Damage Prevention i. ☒ Flood Control
2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

- a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.



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B. Findings (cont.)

Denied because:

- b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**
- c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**
3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input type="checkbox"/> Bank	<u>45 temp</u> a. linear feet	<u>45 temp</u> b. linear feet	<u> </u> c. linear feet	<u> </u> d. linear feet
5. <input type="checkbox"/> Bordering Vegetated Wetland	<u>33,850 temp</u> a. square feet	<u>33,850 temp</u> b. square feet	<u> </u> c. square feet	<u> </u> d. square feet
6. <input type="checkbox"/> Land Under Waterbodies and Waterways	<u>475 temp</u> a. square feet	<u>475 temp</u> b. square feet	<u> </u> c. square feet	<u> </u> d. square feet
	<u> </u> e. c/y dredged	<u> </u> f. c/y dredged		
7. <input type="checkbox"/> Bordering Land Subject to Flooding	<u>6,570 temp</u> a. square feet	<u>6,570 temp</u> b. square feet	<u> </u> c. square feet	<u> </u> d. square feet
Cubic Feet Flood Storage	<u> </u> e. cubic feet	<u> </u> f. cubic feet	<u> </u> g. cubic feet	<u> </u> h. cubic feet
8. <input type="checkbox"/> Isolated Land Subject to Flooding	<u> </u> a. square feet	<u> </u> b. square feet		
Cubic Feet Flood Storage	<u> </u> c. cubic feet	<u> </u> d. cubic feet	<u> </u> e. cubic feet	<u> </u> f. cubic feet
9. <input type="checkbox"/> Riverfront Area	<u>35,370 temp</u> a. total sq. feet	<u>35370 temp</u> b. total sq. feet		
Sq ft within 100 ft	<u>18,000 temp</u> c. square feet	<u>18,000 temp</u> d. square feet	<u> </u> e. square feet	<u> </u> f. square feet
Sq ft between 100-200 ft	<u>17,370 temp</u> g. square feet	<u>17370 temp</u> h. square feet	<u> </u> i. square feet	<u> </u> j. square feet



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B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. <input type="checkbox"/> Land Under the Ocean	a. <u> </u> square feet	b. <u> </u> square feet		
	c. <u> </u> c/y dredged	d. <u> </u> c/y dredged		
12. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. <input type="checkbox"/> Coastal Beaches	a. <u> </u> square feet	b. <u> </u> square feet	c. <u> </u> cu yd c. nourishment	d. <u> </u> cu yd d. nourishment
14. <input type="checkbox"/> Coastal Dunes	a. <u> </u> square feet	b. <u> </u> square feet	c. <u> </u> cu yd c. nourishment	d. <u> </u> cu yd d. nourishment
15. <input type="checkbox"/> Coastal Banks	a. <u> </u> linear feet	b. <u> </u> linear feet		
16. <input type="checkbox"/> Rocky Intertidal Shores	a. <u> </u> square feet	b. <u> </u> square feet		
17. <input checked="" type="checkbox"/> Salt Marshes	815 temp a. <u> </u> square feet	815 temp b. <u> </u> square feet	c. <u> </u> square feet	d. <u> </u> square feet
18. <input type="checkbox"/> Land Under Salt Ponds	a. <u> </u> square feet	b. <u> </u> square feet		
	c. <u> </u> c/y dredged	d. <u> </u> c/y dredged		
19. <input type="checkbox"/> Land Containing Shellfish	a. <u> </u> square feet	b. <u> </u> square feet	c. <u> </u> square feet	d. <u> </u> square feet
20. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. <u> </u> c/y dredged	b. <u> </u> c/y dredged		
21. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	a. <u> </u> square feet	b. <u> </u> square feet		
22. <input type="checkbox"/> Riverfront Area	a. <u> </u> total sq. feet	b. <u> </u> total sq. feet		
Sq ft within 100 ft	c. <u> </u> square feet	d. <u> </u> square feet	e. <u> </u> square feet	f. <u> </u> square feet
Sq ft between 100-200 ft	g. <u> </u> square feet	h. <u> </u> square feet	i. <u> </u> square feet	j. <u> </u> square feet



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B. Findings (cont.)

* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. ☐ Restoration/Enhancement *:

a. square feet of BVW

b. square feet of salt marsh

24. ☐ Stream Crossing(s):

a. number of new stream crossings

b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
 - a. The work is a maintenance dredging project as provided for in the Act; or
 - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
 - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on _____ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.



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C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]
 "File Number SE 081-1313 "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.



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Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.
19. The work associated with this Order (the "Project")
 - (1) ☒ is subject to the Massachusetts Stormwater Standards
 - (2) ☐ is NOT subject to the Massachusetts Stormwater Standards

If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
 - i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
 - ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
 - iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;



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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.



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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

- g) The responsible party shall:
 - 1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
 - 2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
 - 3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

See Conditions #22 -71

- 20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.



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D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No
2. The Weymouth Conservation Commission hereby finds (check one that applies):
 - a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw	2. Citation
---------------------------------	-------------

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.
 - b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

Town of Weymouth Code of Ordinances, Chapter 7, Section 301

1. Municipal Ordinance or Bylaw	2. Citation
---------------------------------	-------------
3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
 The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

See Conditions #21 -71

APPLICANT: Town of Weymouth, Department of Public Works
LOCATION: Lower Central Interceptor Sewer Easement (Commercial - Montcalm)
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General Conditions

20. The Commission's actions on this project are taken under the Weymouth Code of Ordinances Chapter 7, subject to compliance with the conditions and limitations imposed herein, and any work authorized hereafter shall be completed within three (3) years from the date of issuance of this Order. Any request for extension of this Order shall be made, in writing, not less than thirty (30) days before the expiration of this Order. An appeal of an Order issued under Weymouth Code of Ordinances Chapter 7, Section 301 may be taken in Superior Court.
21. No work may begin until the Commission has received certification from the Registry of Deeds or the Land Court or both, as appropriate, that this Order has been recorded in the line of title of the property.
22. A copy of this Order shall be kept on the work site at all times during construction. The applicant is responsible for providing a copy to all contractors and subcontractors, for informing them of its requirements, and for assuring that they comply with those.
23. These Conditions are intended solely as a permit to perform work within areas of the Commission's jurisdiction, and nothing contained herein shall be construed as pre-empting or precluding any other bylaw, ordinance or local regulation.
24. Members and agents of the Commission have the right to enter and inspect the property, as per M.G.L. Ch. 131, §40, and Weymouth Town Code of Ordinances, Chapter 7, in order to evaluate and enforce compliance with this Order. The applicant shall submit data or information that the Commission deems necessary for that evaluation.
25. This Order shall apply to all successors in interest, successors in control, and successors in title. This Condition shall remain in perpetuity and shall not expire with the issuance of the Certificate of Compliance.
26. Before making any change in the project as designed and specified in the plans listed above, the applicant shall inquire of the Commission, in writing, whether the change is so substantial as to require the filing of a new Notice, may be permitted as an amendment to this Order, or may be carried out under these Conditions as issued.
27. The Commission reserves the right to impose additional conditions or require the submission of additional information as necessary to protect the interests of the State and Local Wetland Protection Act.

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Pre-Construction Conditions

28. All required local, state and federal permits shall be obtained before construction begins and copies of required permits shall be provided to the Conservation Administrator.
29. Prior to the start of work, the applicant shall provide the Commission with the name(s), address(es) and telephone number(s) of the person(s) responsible for ensuring on-site compliance with this Order and his or her alternate. This person shall be the Environmental Monitor for the project and shall be given authority to stop construction for erosion control or other environmental purposes.
30. The Conservation Commission shall be notified 48 hours prior to any work on this site.
31. The applicant shall provide photographic documentation of pre-construction conditions for all temporary wetland impact areas. A copy of this documentation shall be provided to the Conservation Commission.
32. Prior to construction or excavation, an erosion control barrier, consisting of a line of silt sock with a wire-backed silt fence, or other controls approved by the Administrator, shall be installed as shown on the approved plans. A registered P.E. or registered land surveyor must certify that the location of the erosion control barrier is as shown on the approved plans, or as otherwise directed by the Commission or its agent. Controls shall be installed in accordance with the "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas" (Mass. DEP, March 1997).
33. The erosion control barriers shall be maintained for the duration of the project. Erosion controls in active work areas shall be inspected daily. Repairs and replacement of the erosion control barriers shall be made as needed to assure proper functioning.
34. Workers at the site shall be told of the purpose of the erosion control barriers and instructed to protect them from damage by tools or machinery. No work, other than environmental protection measures, will be permitted beyond the erosion control barrier and no machinery shall be closer to the resource area than the erosion control barrier. Unless otherwise instructed by the Conservation Administrator, wire-backed silt fence shall be removed following installation and acceptance of the restoration plantings.
35. After installation of the erosion control barrier and/or such other environmental protection as shall be directed by the Commission, and prior to any other work, **the applicant and/or the project manager, and the contractor shall meet on**

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the site with the Conservation Administrator to review the placement of the protection and the Order of Conditions issued for this project. This meeting shall also include a review of areas deemed potentially vulnerable to erosion that will require monitoring during the construction period.

36. **Prior to the start of construction, the applicant or its contractors shall submit the following plans for review and approval by the Conservation Commission;** the Commission may require that the applicant attend a Conservation Commission meeting to discuss the proposed plans:

- a. Final Restoration Plan. The Conservation Commission has reviewed and approved the Draft Restoration Plan prepared by Environmental Partners Group. Final revisions shall be made to the plan that include a conservation seed mix over the upland portion of the new easement a shrub component along the easement where appropriate.
- b. Construction Period Stormwater Pollution Prevention Plan. This plan shall demonstrate proper protection from fuel spills, contingency plans in case of spills, procedures for maintenance, refueling and overnight storage of heavy equipment, erosion controls for material stockpiles, and all other appropriate information.
- c. Construction Dewatering and Discharge Plan. This plan shall include sufficient detail to understand the means and methods for dewatering construction areas and for preventing impacts to wetland resource areas and to demonstrate that dewatering activities and discharges shall not degrade water quality in the Fore River. The plan shall include the means, methods and frequency for testing dewatering discharge and ambient Fore River water to determine acceptability of discharge.
- d. Construction Period Sewer Bypass Plan. This plan shall include measures to protect bypass systems from tidal flow, tidal surges and severe storm events, and severe icing conditions. The plan shall include a contingency plan and environmental protection and response measures in the event of a failure or breakage in the bypass system.

37. Prior to the start of active construction, the applicant or its contractor shall provide to the Conservation Commission the qualifications of its wetland scientist, who shall oversee all construction activities scheduled within wetland resource areas and buffer zones to ensure compliance with this order. The wetland scientist must be deemed to have adequate experience, as demonstrated by his or her qualifications submittal, with construction and restoration projects in coastal wetland environments.

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Construction-Related Conditions

38. **The contractor's wetland scientist shall meet on-site with the Conservation Administrator and project supervisors prior to any work in wetland resource areas, to review the Order of Conditions and environmental protection measures.** This on-site meeting may be combined with the on-site meeting required by condition #35.
39. The applicant shall include the Conservation Commission in the distribution list for the Resident Engineer's weekly construction reports. The Contractor's wetland scientist shall provide monthly project reports during periods when active construction work is occurring in wetland resource areas.
40. The contractor shall comply with the Environmental Protection Measures specified in the Notice of Intent submittal (e.g., pages 10 to 12 of the NOI narrative), the Restoration Plan, and this Order of Conditions.
41. No excavation or activities causing vibration or disturbance shall occur during the Time-of-Year (TOY) restriction from March 1 – June 30 to protect sensitive life stages of rainbow smelt, as recommended in the DMF review letter dated January 30th 2024.
42. A layer of straw or salt marsh hay shall be installed as a marker barrier between existing ground surface and any temporary fill materials (e.g., washed cobble or stone, rip rap, and/or construction mats). Following completion of utility construction, the construction mats and any temporary fill will be removed and coir netting will be installed on top of the straw between the upgradient and downgradient erosion controls. During the appropriate planting season, the wetland restoration plantings will be installed within the coir matting.
43. Construction mats shall be lifted and lowered into place; dragging of mats will be prohibited.
44. The Contractor shall use only low ground pressure equipment (less than 3 psi) within wetland resource areas in which construction mats are not suitable. These areas shall be reviewed with the Conservation Administrator as part of the pre-construction site walks.
45. The limits of work and temporary impacts shall be as shown on the approved plans and as described on page 11 of the NOI narrative, including: 20-foot limit of work over the proposed sewer alignment; excavation shall not extend below Mean High Water; utility trench shall be a maximum of 6 feet wide; and sewer manhole

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excavations shall be a maximum of 100 square feet.

46. Work shall be conducted around the tidal cycles such that open trenches are not inundated by tidal waters. All trenches opened during the construction work day shall be properly backfilled and temporarily stabilized prior to the next high tide and/or the end of the work day.
47. With the exception of soils in areas infested with common reed (*phragmites australis*), soils shall be staged on site and backfilled into the trench with at least the top one foot of soils from the same area and ecotype. If soils are removed from the immediate work area, they shall be identified such that they can be replaced in the proper area. Soils from phragmites-infested areas shall be disposed of as solid waste and the trench backfilled with new soils that meet approved soil specifications.
48. Secondary containment shall be provided for all pumps used on the project site (e.g., sewer bypass and dewatering). Pumping systems shall be operated and maintained by licensed operators 24-hours a day when in use. Fuel for pumps shall not be stored within the sewer easement.
49. Maintenance, storage, and repair of construction equipment shall not be permitted within the limits of wetland resource areas (except that such activities may be allowed within Riverfront Area). Equipment refueling, with the exception of pumping systems, shall not be permitted within 100 feet of wetland resource areas (excluding Riverfront) or surface water bodies. Refueling operations shall be supervised at all times. Construction equipment must be maintained to prevent leakage or discharge of pollutants.
50. All dewatering shall occur in compliance with the approved Construction Period Dewatering Plan.
51. In the event of a malfunction or break in the sewer line or bypass line during construction, the applicant shall contact the Massachusetts Division of Marine shellfish program at shellfish@mass.gov and the Weymouth Conservation Commission.
52. The Commission encourages the applicant to coordinate with the Massachusetts Division of Marine Fisheries (DMF) on potential mitigation strategies for in-stream smelt spawning habitat improvements if the opportunity allows.
53. If, during the course of construction, slopes or coastal bank areas are experiencing erosion or deemed to be vulnerable to erosion or slumping, the applicant or its contractor shall provide a Slope Stabilization Plan. A copy of the plan shall be submitted to the Conservation Commission and/or its Administrator for review

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and approval.

54. The Conservation Commission reserves the right to require the applicant to provide for an independent wetland expert, to report directly to the Commission, for monitoring, oversight, technical review or assistance if deemed necessary to assist with particularly complex or sensitive resource issues.
55. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to replace or repair wire-backed silt fence, coir logs, erosion control matting, straw, stone riprap, or any other devices planned for use during construction.
56. Wetland flagging shall remain in place until the project has been completed and the Certificate of Compliance issued.
57. Where mature trees are to be removed from the easement, stumps may be removed as needed to protect the integrity of the sewer line, but otherwise stumps shall be left in place to avoid creating erosion or bank instability problems.
58. At no time during or after construction shall fill or other materials be placed, slump into or fall beyond the limit of grading as shown on the plan. The applicant shall be responsible for inspecting and maintaining all slopes and walls and shall immediately notify the Commission if slumping, erosion or encroachment occurs.
59. If unforeseen problems occur during construction which may affect the statutory interest of the Wetlands Protection Act or the Town of Weymouth's Wetlands Protection Ordinance, upon discovery by either the Conservation Commission, its agent, or the applicant, the Commission shall immediately be notified, and an immediate meeting shall be held between the Commission or its agent, the applicant, and other concerned parties to determine the correct measures to be employed. The applicant shall then act to correct the problems using the corrective measures agreed upon. Subsequent to resolution, the activity and resulting actions shall be documented in writing. If necessary, the Conservation Commission may require new calculations, to be approved by the Commission or its agent, to support the new findings and corrective measures.

Restoration and Monitoring of Wetland Resource Areas

60. Prior to conducting the restoration planting, the applicant shall provide to the Commission the qualifications of the landscape company selected to conduct the restoration. The company selected must have experience in coastal

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planting/restoration projects below the high tide line.

61. **The project manager/supervisor for the landscape company and the project wetland scientist shall meet on-site with the Conservation Administrator prior to the start of the restoration planting work.**
62. Restoration of wetland resource areas, Riverfront Area, and upland buffer zones shall be conducted according to the final, approved restoration plan (to be submitted per condition 36). Wetland resource areas shall be restored to pre-construction conditions and elevations.
63. Salt-tolerant plants shall be used for plantings below the High Tide Line. Seed mixes shall not be used below the High Tide Line.
64. Mitigation shall be provided for removal of mature trees from the easement by planting trees elsewhere on town-owned land where appropriate. Tree species and location shall be selected to maximize wildlife habitat value. Species, location and size of plantings shall be coordinated with the Conservation Administrator and the Town Arborist and subject to approval by the conservation commission.
65. Monitoring of the restoration area shall be conducted over at least two full growing seasons following plant installation. Post-construction monitoring reports prepared by the applicant's or contractor's wetland scientist shall be provided to the Conservation Commission as follows:
 - Two to four weeks after planting
 - After the end of the first growing season (fall)
 - In late May of the second spring growing season
 - At the end of the second growing season (fall)
 - If the initial planting is conducted after June 15th, an additional spring monitoring will be required to complete the two-year monitoring period.
66. Monitoring reports shall evaluate and document plant health and survival, the presence of invasive species, the stability of fragile resource areas such as coastal bank and salt marsh, and shall make recommendations to correct problems identified.
67. Success of the restoration planting effort shall be determined based on a comparison of pre-existing plant densities and conditions (as described in the NOI and documented in pre-construction photographs) with post-construction densities and conditions (as described in post-construction monitoring reports and

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photographs).

68. Invasive plants within the planted restoration area shall be monitored and removed during the monitoring period.
69. A copy of the post-construction photographs shall be submitted to the Conservation Commission.
70. The Conservation Commission may require additional monitoring beyond the two-year period if all areas are not adequately restored or if areas are deemed vulnerable to erosion and require additional monitoring.

Post-Construction Conditions

71. Upon completion of the project, or any discrete phase thereof, the applicant may request a Partial or Final Certificate of Compliance. All Conditions in the Order must be complied with prior to the issuance of a Final Certificate of Compliance. The request shall be accompanied by the following items:
 - a. A written statement by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts certifying compliance with the Notice of Intent, the approved plans, and this Order of Conditions and setting forth what deviations exist, if any;
 - b. Two sets of as-built site plans prepared by a registered land surveyor or a registered professional engineer showing those activities for which the Certificate of Compliance is sought.
 - c. Two copies of the final two-year monitoring report (or later period if the monitoring period was extended).



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E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

Please indicate the number of members who will sign this form.

This Order must be signed by a majority of the Conservation Commission.

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

03-14-24

1. Date of Issuance

5

2. Number of Signers

Signature

Alexander Donovan

Printed Name

Signature

Frank Singleton

Printed Name

Signature

Scott Dowd

Printed Name

Signature

George Loring

Printed Name

Signature

Charles McCrosson

Printed Name

Signature

Printed Name

Signature

Printed Name

Signature

Printed Name

☒ by hand delivery on

03-14-24

Date

☐ by certified mail, return receipt requested, on

Date



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F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



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G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

Project Location

MassDEP File Number

Has been recorded at the Registry of Deeds of:

County

Book

Page

for:

Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant



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DEP File Number: _____

**Request for Departmental Action Fee
Transmittal Form**

Provided by DEP _____

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

1. Location of Project

a. Street Address _____

b. City/Town, Zip _____

c. Check number _____

d. Fee amount _____

2. Person or party making request (if appropriate, name the citizen group's representative):

Name _____

Mailing Address _____

City/Town _____

State _____

Zip Code _____

Phone Number _____

Fax Number (if applicable) _____

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name _____

Mailing Address _____

City/Town _____

State _____

Zip Code _____

Phone Number _____

Fax Number (if applicable) _____

4. DEP File Number: _____

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



B. Instructions

1. When the Departmental action request is for (check one):

☐ Superseding Order of Conditions – Fee: \$120.00 (single family house projects) or \$245 (all other projects)

☐ Superseding Determination of Applicability – Fee: \$120

☐ Superseding Order of Resource Area Delineation – Fee: \$120



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
Request for Departmental Action Fee
Transmittal Form

DEP File Number: _____

Provided by DEP _____

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Instructions (cont.)

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection
 Box 4062
 Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <https://www.mass.gov/service-details/massdep-regional-offices-by-community>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

APPENDIX E

Wetland Delineation Report



May 10, 2023

Email (rja@envpartners.com)

Mr. Ryan Allgrove
Environmental Partners
1900 Crown Colony Drive, Suite 402
Quincy, MA 02169

**Re: Wetland Resource Area Analysis Report
Lower Central Interceptor Improvements Project
Tide Mill Brook
Weymouth, Massachusetts**

[LEC File #: EPGI\22-491.01]

Dear Mr. Allgrove:

Pursuant to your request, LEC Environmental Consultants, Inc., (LEC) conducted a site evaluation and Wetland Resource Area boundary determination along a segment of Tide Mill Brook located adjacent to a proposed sewer line slated for replacement. The sewer line and existing conditions are depicted on the *Lower Central Interceptor Improvements Project* plans, prepared by Environmental Partners, dated April 2023.

Our site evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act* (the *Act*, M.G.L. c. 131, s. 40), its implementing Regulations (the *Act Regulations*, 310 CMR 10.00), the *Weymouth Wetlands Protection Ordinance* (Chapter 7-301 of the Weymouth Code of Ordinances) and Regulations, and the *Federal Clean Water Act* (33 U.S.C. 1344, s.404, the *CWA*) and its *Regulations* (33 CFR and 40 CFR, the *CWA Regulations*). The following report provides a general site description, wetland delineation methodology, and a description of the Wetland Resource Areas and potential regulatory implications.

General Site Description

The project site is located two miles north of Route 3, one mile south of Route 3A, and southeast of Mill Cove within the northwestern portion of Weymouth, Massachusetts. The segment of the sewer line associated with the project extends north from Commercial Street beneath and approximately 200 feet beyond the MBTA Commuter Rail (Greenbush Line) crossing over Tide Mill Brook (Attachment A, Figures 1 and 2). Tide Mill Brook, a perennial stream, extends roughly parallel and adjacent to the sewer line from Commercial Street north for approximately 750 feet at which point the stream turns northeasterly and away from the sewer line. The sewer line is within a fringing Bordering Vegetated Wetland (BVW) system and Salt Marsh associated with Tide Mill Brook.

LEC Environmental Consultants, Inc.

www.lecenvironmental.com

12 Resnik Road
Suite 1
Plymouth, MA 02360
508.746.9491

380 Lowell Street
Suite 101
Wakefield, MA 01880
781.245.2500

100 Grove Street
Suite 302
Worcester, MA 01605
508.753.3077

P.O. Box 590
Rindge, NH 03461
603.899.6726

680 Warren Avenue
Suite 3
East Providence, RI 02914
401.685.3109

PLYMOUTH, MA

WAKEFIELD, MA

WORCESTER, MA

RINDGE, NH

EAST PROVIDENCE, RI

The BVW is located between Commercial Street and the terminus of Meeting House Lane where it transitions to Salt Marsh. Salt Marsh system becomes increasingly wide beyond the terminus of Meeting House Lane and up to the steep embankments of the MBTA crossing. The Salt Marsh continues on the north side of the crossing eventually flowing into Weymouth Fore River.

Forested uplands are generally located to the west of the sewer line with scattered single-family dwellings located near Commercial Street and Meeting House Lane. Single family dwellings on Trefton Street are located to the west of the sewer line on the north side of the MBTA crossing along the westerly edge of the Salt Marsh.

Topography in and along the sewer line is generally flat within the BVW and Salt Marsh, with moderate to steep slopes to the west into the forested upland. Steep slopes also extend up and downgradient from the MBTA crossing. A portion of the existing sewer line is contained within an elevated earthen berm measuring approximately 70 feet long by 5 feet wide.

Vegetation observed within the bordering forested uplands include a canopy layer of red oak (*Quercus rubra*), Norway maple (*Acer platanoides*), American beech (*Fagus grandifolia*), and black cherry (*Prunus serotina*). The understory includes a shrub layer containing privet (*Ligustrum sp.*), sweet pepperbush (*Clethra alnifolia*), Russian olive (*Elaeagnus angustifolia*), multiflora rose (*Rosa multiflora*), and Japanese Barberry (*Berberis thunbergii*). The sparse groundcover layer contains patches of garlic-mustard (*Alliaria petiolata*), and wintergreen (*Gaultheria procumbens*). Entanglements of common greenbrier (*Smilax rotundifolia*), common blackberry (*Rubus allegheniensis*), Asiatic bittersweet (*Celastrus orbiculatus*), and poison ivy (*Toxicodendron radicans*) are present throughout the upland portions of the site.

LEC inspected soil conditions within the adjacent upland areas using a hand-held, Dutch-style auger, and observed a variety of upland soils. Within forested scrub-shrub upland, LEC observed a 3-inch thick, fine sandy loam topsoil (A-Horizon) with a soil matrix color of 10YR 2/1, directly underlain by a 12-inch thick, fine sandy loam subsoil (B₁-Horizon), with a soil matrix color of 10YR 3/2, directly underlain by a 10-inch thick, sandy loam subsoil (B₂-Horizon), with a matrix color of 10YR 4/5. No redoximorphic features were observed within the soil profile. These soil profiles are not considered 'hydric' in accordance with the *Field Indicators for Identifying Hydric Soils in New England* (Version 4, May 2020).

Natural Heritage and Endangered Species Program (NHESP) Designation

According to the 15th Edition of the *Massachusetts Natural Heritage Atlas* (effective August 1, 2021) published by the Natural Heritage & Endangered Species Program (NHESP), the Site is not located within *Estimated Habitat of Rare Wildlife* or *Priority Habitat of Rare Species*. No Certified Vernal Pools (CVP) or Potential Vernal Pools (PVP) are mapped on or within the immediate vicinity of the Site (Attachment A, Figure 2).

Floodplain Designation

According to the June 9, 2014, FEMA Flood Insurance Rate Map (FEMA FIRM) for the Town of Weymouth, Norfolk County (*Community Panel 250257 0227*), the majority of the Site is located within a Zone AE (NAVD 88, EL 10.0) – *Special flood hazard areas subject to inundation by the 1% annual chance flood, base flood elevations determined*. The remaining southern portion of the Site is located within a Zone X (unshaded) – *Areas of 2% annual chance flood; areas of 1% annual chance flood with average depths less than 1 foot or within drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood* (Appendix A, Figure 3).

Wetland Boundary Determination Methodology

On December 22, 2022, and December 29, 2022, LEC conducted site evaluations to identify and characterize existing protectable Wetland Resource Areas within 100 feet of the project footprint. Based on our observations and review of relevant maps, LEC identified and delineated the Wetland Resource Areas located in proximity to the project footprint, including BVW, Salt Marsh, and Bank-Mean Annual High Water (Bank-MAHW). Land Subject to Coastal Storm Flowage (LSCSF) is present within the project area, but was not delineated in the field since it is based on the FEMA FIRM elevation. Coastal Bank may also be present along the westerly slopes adjacent to the sewer line and the MBTA crossing but was not delineated in the field. Coastal Bank should be delineated in accordance with DEP Program Policy DWW 92-1, *Definition and Delineation Criteria for Coastal Bank* (March 3, 1992).

The extent of BVW was determined through observations of existing plant communities and hydrologic indicators in accordance the Massachusetts Department of Environmental Protection (MassDEP) handbook, *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act* (September 2022), the *Field Indicators for Identifying Hydric Soils in New England* (Version 4, June 2020), and the criteria set forth in 310 CMR 10.55.

The boundaries of BVW were demarcated in the field with blaze orange surveyor's flagging tape embossed with the words "LEC Resource Area Boundary" in bold, black print. The BVW flags are numbered 1 to 25 and 2-1 to 2-17.

Salt Marsh was identified and demarcated in accordance with criteria set forth at 310 CMR 10.32(2). The boundaries of Salt Marsh (SM) were demarcated in the field with blaze blue surveyor's flagging tape and numbered SM1-SM8.

Bank-MAHW was identified and demarcated along Tide Mill Brook in accordance with criteria set forth at 310 CMR 10.58(2)(a)(2). The Bank-MAHW boundaries were demarcated with blaze blue surveyor's flagging tape and numbered 1-1 to 1-34 (west side) and 2-1 to 2-38 (Attachment B). In the tidal section of the river, Bank-MAHW is the Mean High Water (MHW) elevation as discussed below.

A brief description of the Wetland Resource Areas is provided below.

Bordering Vegetated Wetland (BVW)

According to the *Act Regulations* [310 CMR 10.55(2)], Bordering Vegetated Wetlands are defined as: *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes...Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants...The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.*



Photo 1. An easterly view of BVW along Tide Mill Brook.

BVW located onsite is associated with Tide Mill Brook. The moderately dense forested scrub-shrub BVW extends on both sides of the stream heading north from Commercial Street toward the Salt Marsh. The freshwater plant community transitions to *Phragmites* in the central portion of the project area near the landward extent of tidal influence and the Salt Marsh.

Vegetation within the forested scrub-shrub BVW includes a canopy dominated by red maple (*Acer rubrum*), tupelo (*Nyssa sylvatica*), willow (*Salix* sp.), and individual

mature silver maple trees (*Acer saccharinum*). The understory contains saplings from the canopy layer, silky dogwood (*Cornus amomum*), highbush blueberry (*Vaccinium corymbosum*), arrowwood (*Viburnum dentatum*), common reed (*Phragmites australis*), Japanese knotweed (*Fallopia japonica*), multiflora rose, and entanglements of Asiatic bittersweet, common briar, and poison ivy. The groundcover includes garlic mustard (*Alliaria petioloata*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundastrum cinnamomeum*), sedges (*Carex* sp.), and rushes (*Juncus* sp.).

LEC inspected soil conditions using a hand-held, Dutch-style auger within the BVWs and generally observed a 20-inch thick, fine sandy loam topsoil (A-Horizon) with a soil matrix color of 10YR 2/1. High-chroma redoximorphic features with a color of 7.5YR 3/4 were observed starting at 5 inches below the mineral soil surface. This soil profile is considered a hydric soil in accordance with *Field Indicators for Identifying Hydric Soils in New England* (Version 4, May 2020), as it meets the indicator F6: *Redox Dark Surface*.

Salt Marsh

Salt Marsh is defined at 310 CMR 10.32 to mean *a coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils. Dominant plants within salt marshes are salt meadow*

cord grass (Spartina patens) and/or salt marsh cord grass (Spartina alterniflora). A salt marsh may contain tidal creeks, ditches and pools.

The northernmost portion of the Site, which includes both the south and north side of the MBTA crossing, contains extensive Salt Marsh. Vegetation observed within the low marsh was dominated by Salt Marsh cordgrass (*Spartina alterniflora*), while the high marsh is dominated by salt meadow cordgrass (*Spartina patens*), spike grass (*Distichilis spicata*), and sea-blite (*Suaeda maritima*). Other species observed within the high marsh include high-tide bush (*Iva frutescens*), groundsel tree (*Baccharis*



Photo 2. A southerly view Salt Marsh.

halimifolia), sea-side goldenrod (*Solidago sempervirens*), and *Phragmites*. The Salt Marsh includes a portion of the large colony of *Phragmites* that occupies the transitional area between freshwater conditions and tidally influenced saltwater conditions.

Bank-Mean Annual High Water

According to the *Act Regulations*, Bank is the *first observable break in slope or the mean annual flood level, whichever is lower. The lower boundary of a Bank is the mean annual low flow level* [310 CMR 10.54 (2) (c)].

According to the *Act Regulations* [310 CMR 10.58(2)(a)(2)], Mean Annual High Water (MAHW) is defined as *the line that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water and that distinguishes between predominantly aquatic and predominantly terrestrial land. Field indicators of bankfull conditions shall be used to determine the mean annual high-water line. Bankfull field indicators include but are not limited to: changes in slope, changes in vegetation, stain lines, top of pointbars, changes in bank materials, or bank undercuts.*

According to the *Act Regulations* [310 CMR 10.58(2)(a)(2)(c)], *In tidal rivers, the mean annual high-water line is coincident with the mean high water line determined under 310 CMR 10.23.*

According to the *Act Regulations*, Mean High Water Line means the *line where the arithmetic mean of the high water heights observed over a specific 19-year metonic cycle (the National Tidal Datum Epoch) meets the shore and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce.*

Tide Mill Brook originates in the southern vicinity of the site and flows through a culvert beneath Commercial Street extending north for approximately 1,000 feet before entering a culvert beneath the



Photo 3. A northerly view of Tide Mill Brook.

MBTA crossing and continuing north within the Salt Marsh system.

Bank/MAHW was delineated in the field from Commercial Street to the approximate location at which stream characteristics exhibited tidal influence. From this point, the MAHW line is coincident with the MHW elevation (determined by Environmental Partners to be 11.0).

Stream characteristics vary as Tide Mill Brook extends north through the site.

Within the southern vicinity of the site, extending approximately 300 feet from

Commercial Street, the perennial stream initially meanders through a moderately well-defined stream channel measuring approximately 3-15 feet wide, with Bank heights between 1-2 feet and water depths between 1-1.5 feet. The stream substrate along this vicinity is uniform and consists of a sandy substrate with leaf detritus, as well as rocks and pebbles with small to medium sized boulders interspersed. The Banks are vegetated with the forested scrub-shrub wetland vegetation described above. As Tide Mill Brook extends further north, the stream channel becomes increasingly well defined, conveying flow within Bank contained within dense stands of *Phragmites*. Stream widths range between 3-7 feet, with Bank heights ranging between 2-4 feet high and water depths of 1-3-feet. The stream substrate along this vicinity is uniform and consists of a mucky substrate with leaf detritus, exposed soil, and small boulders embedded along the banks.

Riverfront Area

According to the *Act Regulations* [310 CMR 10.58 2(a)], Riverfront Area is defined as *the area of land between a river's mean annual high-water line and a parallel line measured horizontally 200 feet away*.

Riverfront Area extends 200 feet horizontally from the Bank-MAHW line associated with Tide Mill Brook. Riverfront Area contains BVW, Salt Marsh, and upland areas along the river.

Land Subject to Coastal Storm Flowage

Land Subject to Coastal Storm Flowage (LSCSF) is defined at 310 CMR 10.04 as *land subject to any inundations caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater*.

No field delineation was conducted for this resource area. The boundary for LSCSF is taken directly from the FEMA FIRM map by scaling or digitizing the exact line as shown and plotted on the site plan. The FEMA FIRM indicates that the survey area is located within Zone AE (elevation 10.0 NAVD88). As a result, the majority of the site is located within LSCSF (Attachment A, Figure 3).



Summary

LEC delineated the boundaries of BVW, Salt Marsh, and Bank-MAHW in the vicinity of the sewer replacement project referenced as the Lower Central Interceptor Replacement Project in Weymouth. The project area also contains the 100-foot Buffer Zone to BVW and Salt Marsh, Riverfront Area, LSCSF, and potentially Coastal Bank. These Wetland Resource Areas are protected under the *Massachusetts Wetlands Protection Act* (the *Act*, M.G.L. c. 131, s. 40), its implementing Regulations (the *Act Regulations*, 310 CMR 10.00), the *Weymouth Wetlands Protection Ordinance* (Chapter 7-301 of the Weymouth Code of Ordinances) and Regulations, and the *Federal Clean Water Act* (33 U.S.C. 1344, s.404, the *CWA*) and its *Regulations* (33 CFR and 40 CFR, the *CWA Regulations*).

Sincerely,

LEC Environmental Consultants, Inc.

A handwritten signature in black ink that reads "Nate Goshgarian".

Nathan Goshgarian
Wetland Scientist

A handwritten signature in black ink that reads "Mark L. Manganello".

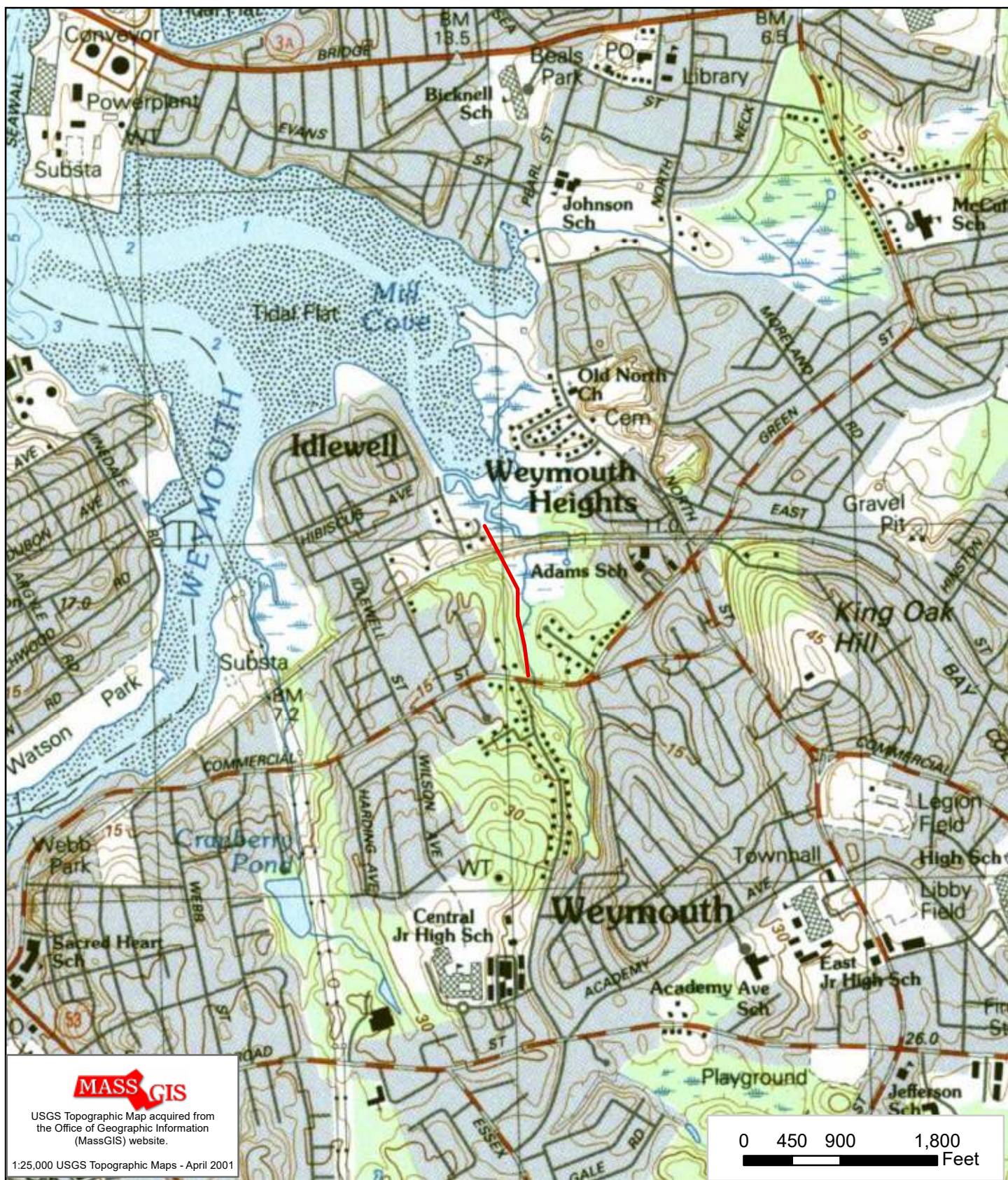
Mark Manganello
Assistant Director of Ecological Services

Attachment A

Figure 1: USGS Topographic Map

Figure 2: Aerial Orthophoto Map

Figures 3: FEMA Flood Insurance Rate Map



LEC Environmental Consultants, Inc.

Plymouth, MA
 508.746.9491
www.lecenvironmental.com

Figure 1: USGS Topographic Map

Approximate Project Location
 Weymouth, Massachusetts

N

 May 10, 2023

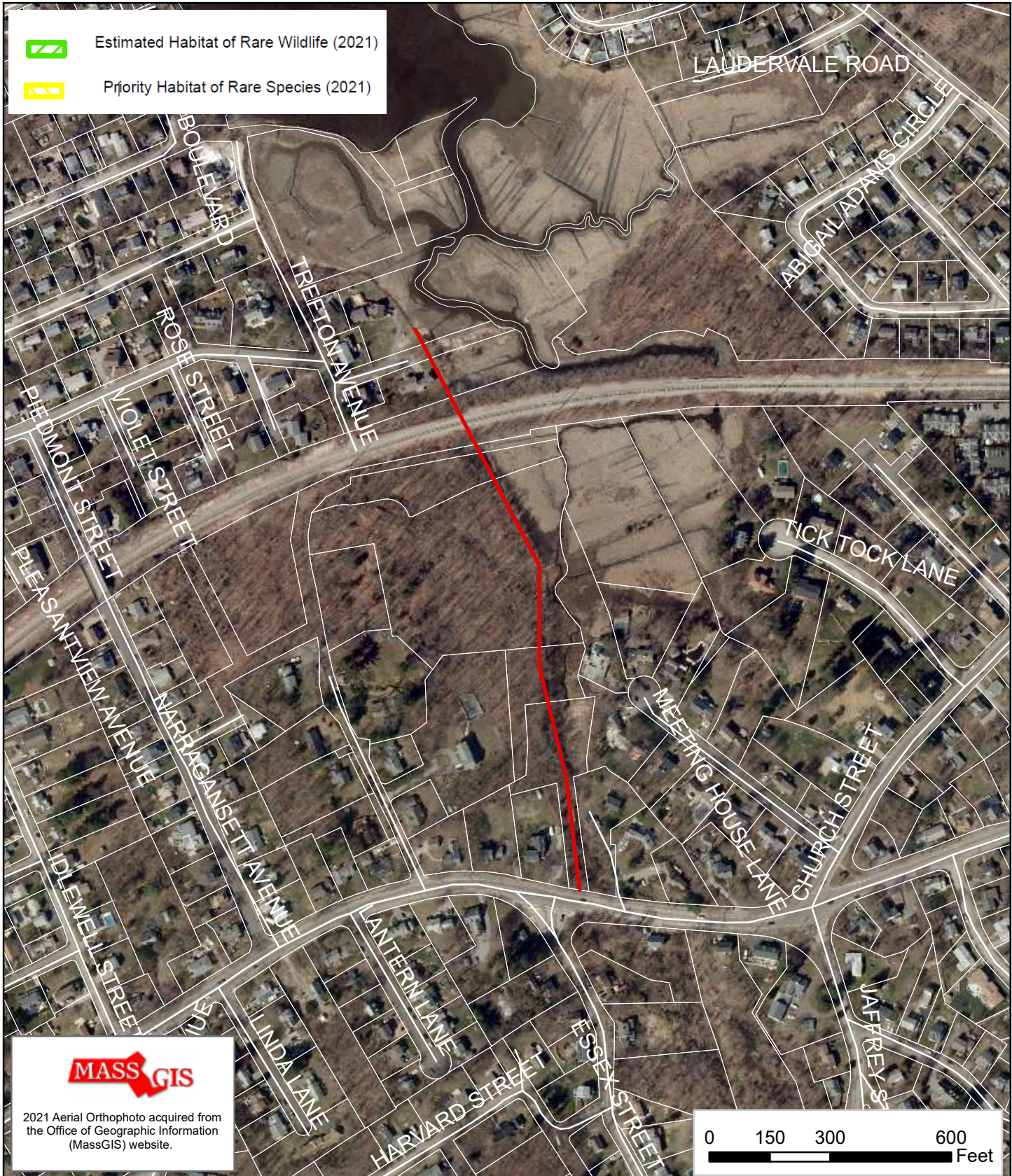
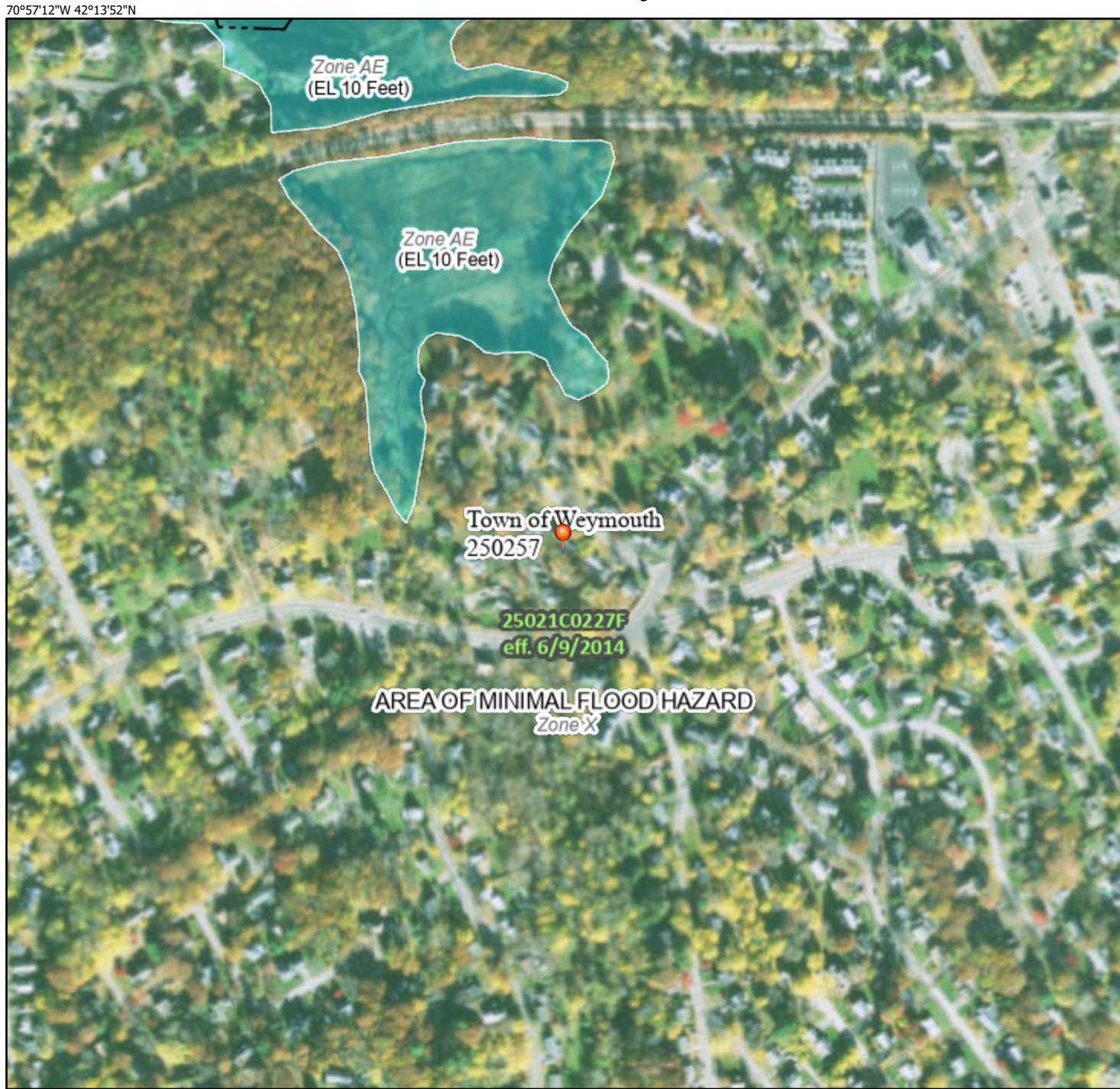


Figure 2: Aerial/NHESP Map
Approximate Project Location
Weymouth, Massachusetts

Figure 3: National Flood Hazard Layer FIRMette



0 250 500 1,000 1,500 2,000 Feet 1:6,000
Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
OTHER FEATURES		Levee, Dike, or Floodwall
		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/10/2023 at 2:35 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX F

Town of Weymouth MBE/WBE Enterprise Program

MINORITY BUSINESS ENTERPRISE PROGRAMS (MBE) WOMEN BUSINESS ENTERPRISE PROGRAMS (WBE)

CONTRACT COMPLIANCE REQUIREMENTS

GENERAL

The Town of Weymouth has put into effect a Town-Wide Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) Program. **To comply with the requirements of these programs, the apparent low bidder must submit to the Awarding Authority, the appropriate MBE/WBE forms within 5 working days after the receipt of bids.** The Awarding Authority, at their discretion, may grant an extension of time to submit these documents, if deemed to be appropriate and in the public interest to do so. Letters of Intent are not required for subcontractors, however, filed sub bidders who are SOMWBA Certified shall be listed on the Participation Schedule. Submit the completed Participation Schedule and Letters of Intent to:

Town of Weymouth
75 Middle Street
Weymouth, Massachusetts 02189
781-335-2000

Failure to submit the required Participation Schedule and Letters of Intent or failure to meet the percentage of participation stated or failure to produce acceptable evidence of unsuccessful attempts at compliance will result in rejection of the bid. The bidder will be ineligible for contract award unless the Awarding Authority has granted a waiver or extension of time. Requests for such a waiver or extension must be made to the Awarding Authority by 4:30 PM on the fifth (5th) working day following the general bid opening. In cases of such failure, the next lowest eligible bidder shall be notified or given five (5) working days to submit the Participation Schedule and Letters of Intent.

The Bidders must submit, prior to, and as a condition of contract approval, signed subcontracts with all subcontractors or a purchase order or invoice from material suppliers or manufacturers listed on the Participation Schedule unless waivers are granted.

Filed sub bidders are not required to submit a Participation Schedule. They may, at their option, if they are a SOMWBA Certified Enterprise, submit a Letter of Intent with their bid. If a filed subcontractor intends to sub-sub work to a SOMWBA Certified Enterprise, and the general contractor wishes for the subcontract to be credited towards participation for this contract, a Participation Schedule and Letter of Intent is required.

PROCEDURE

The Town of Weymouth's MBE/WBE requirements are as follows:

1. Secure a copy of the State Office of Minority and Women Business Assistance (SOMWBA) Certified Minority and Women Directory. The Town of Weymouth will accept only MBE and WBE firms approved by SOMWBA. Copies of the directory are available from SOMWBA, 100 Cambridge Street, 13th Floor, Boston, Massachusetts 02202; or you may purchase the directory at the State House Book Store.
2. Attempt to develop a bid that includes a goal of not less than ten percent (10%) of the total bid price to be spent on Minority Business Enterprises and a goal of not less than five percent (5%) of the total bid price to be spent on Women Business Enterprises. These goals are met by subcontracting work to, or purchasing materials from, one or more SOMWBA approved Minority Business and Women Business Enterprises.
3. To make the attempt to secure at least ten percent (10%) Minority Business Participation and at least five percent (5%) Women Business Participation, the general contractor should contact as many of the subcontractors of services/supplies in the SOMWBA Directory as necessary, and should keep a record of each firm contacted; and all other information called for under Special Provisions for Participation by Minority and Women Business Enterprise.
4. If you are successful in securing at least ten percent (10%) or more Minority Business Participation and at least five percent (5%) or more Women Business Participation, you must:

- A. Complete and submit Schedule for Participation by Minorities and Women Business Enterprise.
 - B. Have each participating Minority/ Women Owned Business complete a Letter of Intent to participate.
5. If, after contacting all the SOMWBA approved firms in the trades or materials categories you are not able to secure at least ten percent (10%) Minority Business Participation and five percent (5%) Women Business Participation, then you must:
 - A. Complete and submit Contractor Request for an Extension.
 - B. Complete and submit Information on Unsuccessful MBE/WBE Contact.
6. Prior to awarding a contract, Items 1 and 2 must be completed to reflect the ten percent (10%) and five percent (5%) respectively, unless the contractor can support why they cannot comply with the established requirements.

SPECIAL PROVISIONS FOR PARTICIPATION BY MINORITY AND WOMEN BUSINESS ENTERPRISES

I. PERCENTAGE PARTICIPATION

Under this contract the percentage goal of the work required to be performed by the Minority and Women Businesses shall be a goal of not less than the following percentages of the total contract price:

- Minority Contractor – Ten Percent (10%) Women Contractor – Five Percent (5%)

II. DEFINITIONS

For the purposes of this Special Provision, the following terms are defined:

- A. Minority – Refers to persons who are citizens or lawful permanent residents of the United States and whose origins are in any of the following racial or ethnic groups: Black, Cape Verdean, Central/South American, Native American or Asian.
- B. Women – Self explanatory.
- C. Contractor – Refers to any business who contracts or subcontracts construction, demolition, renovation or maintenance work in the various classifications customarily used in public work and is acting in this capacity under the subject contract.
- D. Minority and Women Contractors – Refers to any contractor determined by the State Office of Minority and Women Business Assistance (SOMWBA) to be at least fifty-one percent (51%) owned and controlled by minority persons or women as appropriate, hereinafter referred to as MBE/WBE.
 - In the case of any business organization other than a joint venture, the business shall be considered a MBE/WBE only if it is independently owned and operated and if minority persons or women have at least fifty-one percent (51%) beneficial ownership and control of the business including, where applicable, to the particular form of business organization, at least fifty-one percent (51%) of each of the following:

Participation in management of the enterprise includes;

 - (a) Unrestricted voting rights;
 - (b) Unrestricted and unencumbered ownership including the right to partake of all the benefits attached to ownership.
 - If a corporation has more than one class of stockholders, the ownership requirements must be met as to each class of stock. The existence of any agreements, options

rights of conversion or other restraints on the existing distribution or ownership and control, which may be exercised within three years and which, if executed, could reduce minority/women ownership or control to less than fifty-one percent (51%), shall establish that the existing business enterprise does not qualify as an MBE/WBE.

E. Joint Ventures - A joint venture between a certified MBE/WBE and a non-certified MBE/WBE shall be certified by SOMWBA as a MBE/WBE if the certified MBE/WBE has at least fifty-one percent (51%) control over the management and receipt of profits of the project bid upon.

- A joint venture between a certified MBE/WBE subcontractor and a non MBE/WBE subcontractor, in which the MBE/WBE does not exercise more than fifty-one percent (51%) control over management and profits, shall be entitled to MBE/WBE credit equal to that portion of the MBE/WBE's participation in the joint venture. For example, if the MBE participates in twenty percent (20%) of the work, the contractor is entitled to twenty percent (20%) credit.
- Whenever a general bid is filed jointly with a certified MBE/WBE participant in the joint venture and the MBE/WBE does not exercise more than fifty-one percent (51%) control over management and profits, that joint venture shall be entitled to MBE/WBE credit equal to that portion of the MBE/WBE's participation in the joint venture. For example, if the MBE participates in twenty percent (20%) of the work, the contractor is entitled to twenty percent (20%) credit.
- Whenever a joint venture with a certified MBE/WBE participant files a general bid or sub bid, and requests credit as an MBE/WBE, the bid must be accompanied by the pre bid joint venture agreement for that project. SOMWBA certified joint ventures should submit a copy of SOMWBA certification.

F. Material Supplier – Refers to a vendor certified by SOMWBA as a MBE/WBE engaged in sales to the construction industry from an established place of business or source of supply, which either;

(a)Manufactures goods from raw materials or substantially alters them before resale, entitling the general contractor to MBE/WBE credit for the full amount of the purchase order; or

(b)Maintains a storage facility for materials utilized in the work, entitling the general contractor to MBE/WBE credit for ten percent (10%) of the purchase order.

G. Perform – Refers to doing work by a contractor by its own organization either under the prime contract or a subcontract approved by the Commission.

H. Percent of Total Price – The percentage of work a MBE/WBE participates in of the entire contract should represent the same percentage of money of the entire contract that the MBE/WBE is entitled.

III. DETERMINATION OF MBE/WBE CONTRACTORS BY THE STATE OFFICE OF MINORITY AND WOMEN BUSINESS ASSISTANCE (SOMWBA)

- Any contractor or subcontractor, sub-sub contractor or materials supplier may apply to SOMWBA for MBE/WBE status. Applications shall be made on a form provided by SOMWBA entitled SOMWBA MINORITY AND WOMEN BUSINESS APPLICATION.
- SOMWBA will prepare, publish and update from time to time a list of MBE/WBE's for the purpose of providing a reference source to assist any contractor in meeting the requirements of this Special Provision. Contractors shall seek assurances from their proposed subcontractor and materials supplier that it meets the SOMWBA requirements for designation as a MBE/WBE.
- In meeting the requirements of this Special Provision, contractors are not limited to the list referred to in sub section IIIB. In seeking out and negotiating with MBE/WBE's and determining which item of work shall be subcontracted to MBE/WBE contractors but said subcontractors must be SOMWBA certified prior to the award of a contract.

- Contractors shall exercise their own judgement in selecting any subcontractor to perform any portion of the work.

IV. REQUIREMENTS FOR CONTRACT AWARD

- The general contractor shall submit Item I and Item II under Schedule for Participation by Women and Minority Business Enterprise with a Letter of Intent. A separate Letter of Intent shall be signed by each MBE/WBE proposed to be used by the contractor. The Letter of Intent includes, among other things, the contract items that the MBE/WBE is proposing to perform and the prices that the MBE/WBE proposes to charge for the work.
- Item I and Item II under Schedule for Participation by Women and Minority Business Enterprise shall list those MBE/WBE's with whom the contractor intends to subcontract, identifying the total price to be paid to each MBE/WBE as taken from each Letter of Intent.
- For all prospective MBE/WBE's not included in the SOMWBA list of MBE/WBE's referred to in subsection III, the contractor shall submit the SOMWBA Minority and Women Certification Application.
- If, after contacting all the SOMWBA approved firms in the trades or materials categories a contractor is unable to secure at least ten percent (10%) Minority Business Participation and at least five percent (5%) Women Business Participation; the contractor must complete the following:
 - (a) Contractor Request for an Extension
 - (b) Information on Unsuccessful MBE/WBE Contact
- A ten (10) day extension will subsequently be granted in writing by the town for the purposes of completing the MBE/WBE goals established by the town as identified in section I.

V. COMPLIANCE

- If the Participation Schedule or any of the Letters of Intent are materially incomplete, the Awarding Authority shall rescind its vote of award, treat the bid informal as to substance and reject the bid. If the Participation Schedule or any of the Letters of Intent are incomplete in other respects, the Awarding Authority may waive the informalities upon the satisfactory completion of the required information by the contractor and the MBE/WBE as applicable.
- If the Awarding Authority finds that the percentage of the MBE/WBE participation submitted by the contractor on his Participation Schedule does not meet the percentage requirements in Section I and the contractor has not or cannot otherwise comply with the requirement, the Awarding Authority shall rescind its vote of award and find such contractor not eligible for award of the contract.
- The Awarding Authority has the right to approve or not approve all subcontractors.
- The contractor shall not perform or subcontract to any other contractor, any work designated for the named MBE/WBE on the Schedule submitted by the contractor under Section V without the approval of the Town of Weymouth.
- A contractor's compliance with the percentage requirement identified in Section I shall continue to be determined by reference to the required percentage of the total contract price as stated in Section I even though the total of actual contract payments may be greater or less than the bid price.
- A contractor who has complied with their schedule submitted under Section IV, except for approved underruns, deletions or other changes affecting performance of the items of work listed in the Schedule shall be considered to have met their obligations under this Special Provision.

- Any change or substitution of the officers or stockholders in the MBE/WBE organization that reduces the minority/women ownership or control to less than the requisite percentage will immediately rescind the MBE/WBE designation. Compliance with this Special Provision obligation will be considered terminated immediately upon notification that the MBE/WBE designation has been rescinded. The contractor shall then proceed in accordance with Section V.
- The contractor shall notify the Town of Weymouth and SOMWBA of any evident facts indicating that he will be unable to comply with Section I.
- If the contractor desires to comply with Section I but for reasons beyond their control cannot subcontract work to MBE/WBE in accordance with the Participation Schedule submitted by the contractor under Section IV, the reasons for their inability to comply with their own Schedule may be submitted to the Town of Weymouth and SOMWBA identifying the new proposed revisions to the Schedule identifying how the obligations under Section I will be met. If approved by the Town of Weymouth, the new revised Participation Schedule shall govern the contractor's performance schedule in meeting the Town of Weymouth's obligations under this Special Provision.

VI. SANCTIONS

- If the contractor does not comply with the terms of this Special Provision, the Awarding Authority may:
 - (a) Suspend any payment for the work that should have been performed by a MBE/WBE pursuant to the schedule or;
 - (b) Require specific performance of the contractor's obligation under Section I by requiring the contractor to subcontract with a MBE/WBE for any contract or specialty item at the contract price established for that item in the Participation Schedule submitted by the contractor.
- To the extent that the contractor has not complied with the terms of this Special Provision, the Awarding Authority may retain an amount determined by multiplying the total bid price of the contract by the percentage in Section I, less any amount paid to MBE/WBE's for work performed under the contract and any payments already suspended under Section VI.
- In addition, or as an alternative, to the remedies under Section VI, the Awarding Authority may suspend, terminate or cancel this contract, in whole or in part, or may call upon the contractor's surety to perform all terms and conditions of the contract, unless the contractor is able to demonstrate his compliance with the terms of this Special Provision, and further deny to the contractor the right to participate in any future contracts awarded by the Awarding Authority or a period of up to three (3) years.
- In any proceeding involving the imposition of sanctions by the Awarding Authority, no sanctions should be imposed if the Awarding Authority finds that the contractor has taken every possible measure to comply with the Special Provision or that some other justifiable reason exists for waiving the Special Provision in whole, or in part.
- The contractor shall provide such information as is necessary in the judgement of the Awarding Authority to ascertain its compliance with the terms of this Special Provision.

VI. HEARINGS AND APPEAL

- No sanctions under Section IV shall be imposed by the Awarding Authority except in an adjudicator proceeding that may be appealed under the provisions of Chapter 30A of the Massachusetts General Laws.
- A contractor shall have the right to request suspension of any sanctions imposed under Section VI upon a showing that he is in compliance with this Special Provision.

Name and Address of WBE	Nature of Participation	Dollar Value of Participation
1.		
2.		
3.		
/	/	/
Total WBE Commitment (dollars)	/	\$
Total WBE Commitment (percentage)	/	%
/	/	/
Total Bid Price	/	\$

SCHEDULE FOR PARTICIPATION BY
MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE
Page 2

The General Bidder agrees that once they have been awarded the contract, they will comply with the ten percent (10%) Minority Business Participation (MBE) and five percent (5%) Women Business Participation (WBE). Breach of this commitment constitutes a breach of the contract.

Date	_____
Name of General Bidder	_____
Signature	_____
Name and Title	_____
Business Address	_____
City/Town and State	_____
Business Phone	_____
Business FAX	_____

**LETTER OF INTENT BY
MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE**

Note: This page is to be completed by the MBE's and WBE's submitted by the General Bidder.

My company intends to perform work as:

_____ an individual
_____ a corporation
_____ a partnership
_____ a joint venture with _____
_____ other (please explain) _____

My company has been certified by SOMWBA and it has not changed its minority/women ownership, control or management without notifying SOMWBA within thirty (30) days of such change.

My company understands that if your company is awarded the contract, your company intends to enter into an agreement with my company to perform the activity described below for the prices indicated. My company also understands that your company, as General Bidder, will make substitutions only as allowed by Section V of the Special Provisions.

MBE/WBE PARTICIPATION

Name of MBE/WBE	Quantity	Unit Price	Amount
1.		\$ per	\$
2.		\$ per	\$
3.		\$ per	\$
4.		\$ per	\$
Total Amount	//////////////////////////////////// ////////////////////////////////////	//////////////////////////////////// ////////////////////////////////////	\$

Date _____
Name of MBE/WBE _____
Signature _____
Name and Title _____
Business Address _____
City/Town and State _____
Business Phone/FAX _____

**CONTRACTOR REQUEST FOR AN EXTENSION
MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE**

The below signed general bidder certifies that it made a good faith effort to develop the required ten percent (10%) Minority and five percent (5%) Women Business Enterprise Participation in this contract but was able to develop only _____ percent.

The below signed general bidder further certifies that it contracted the firms listed below from the State Office of Minority and Women Business Assistance (SOMWBA) Directory and that said contacts were bona fide efforts to develop the required contract but were unsuccessful due to circumstances beyond the control of the general bidder. The information given on the following pages about each contact is accurate and complete.

MBE/WBE 's contacted:

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10	20.

The below signed general bidder therefore requests that the Town of Weymouth grant an extension of ten (10) working days in order to provide the general bidder an opportunity to secure the required percentage of MBE/WBE Participation.

Date _____

Name of General Bidder _____

Signature _____

Name and Title _____

Business Address _____

City/Town and State _____

Business Phone/FAX _____

**INFORMATION ON UNSUCCESSFUL MBE/WBE CONTACT
MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE**

Note: Additional copies of this form shall be prepared by the general bidder in the quantity necessary for each MBE/WBE listed on the previous page.

1. Name of MBE/WBE contacted _____

2. Address of MBE/WBE contacted _____

3. Telephone of MBE/WBE contacted _____

5. Date of initial contact _____

(a) _____ by telephone

(b) _____ in person

(c) _____ by mail

6. Sub-Contract work offered to MBE/WBE _____

7. Result of contact (Please check appropriate answer.)

(a) _____ MBE/WBE declined job

(b) _____ MBE/WBE offered to do job at price of \$_____, which was determined to be too high

(c) _____ MBE/WBE offered to do job at price of \$_____, which was satisfactory, however, MBE/WBE was judged by our company to be unqualified for the job

(d) _____ other

8. Name and title of MBE/WBE officer who can verify the above _____

It is certified herewith by the below-signed general bidder that the above information is accurate and complete.

Date _____

Name of General Bidder _____

Signature _____

Name and Title _____

Business Address _____

City/Town and State _____

Business Phone/FAX _____

APPENDIX G

401 Water Quality Certification



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

APR 26 2024

Sabrina Castaneda
c/o Kenan Connell
Epsilon Associates
18 Commerce Way
Woburn, Massachusetts 01801

RE: WATER QUALITY CERTIFICATION
APPLICATION FOR: BRP WW 10
MAJOR PROJECT CERTIFICATION

AT: Tide Mill Brook
DPW Sewer Easement Montcalm Street to Commercial Street
Weymouth, Massachusetts 02188

Application ID Number 24-WW10-0003-APP
Wetlands Protection Act File Number SE 081 - 1313

Dear Miss. Castaneda:

The Massachusetts Department of Environmental Protection has reviewed your application for Water Quality Certification, as referenced above. In accordance with the provisions of MGL c.21, §§ 26-53, Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), MassDEP certifies in accordance with 314 CMR 9.00 that there is reasonable assurance the project or activity will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other applicable requirements of state law.

The project consists of the installation of 1,150 linear feet of new 42-inch sewer to replace a 1,300 linear foot portion of the existing Lower Central Interceptor (LCI) sewer to address chronic sanitary sewer overflows into environmentally sensitive areas. Work will include pipe jacking under an MBTA railroad, excavation, and general construction work. The existing LCI sewer is a 30-inch diameter reinforced concrete gravity sewer constructed in 1949. The proposed LCI replacement is a 42-inch diameter PVC gravity sewer installed in a new alignment that would relocate the sewer from delineated wetlands and into the buffer zone. The total scope of

the construction limits is 46,850 square feet, with 4,150 square feet within bordering vegetated wetland and 815 square feet within salt marsh.

The proposed horizontal limit of work will be a maximum of 20-feet wide over the proposed sewer alignment, and excavation shall not extend beyond the mean high water. The utility trench for the installation of the proposed sewer alignment will be a maximum of 6-feet wide and of a sufficient depth to allow for installation of the sewer pipe and associated bedding and backfill materials. Manhole excavation areas are proposed to be a maximum of 100 square feet (10-feet wide and 10-feet long) and of sufficient depth to allow installation of the sewer structures and associated bedding and backfill materials. Construction matting shall be installed over areas of BVW within the easement to minimize ground impacts outside of excavation, and all equipment and materials are to be kept on top of matting within the easement. Erosion and sediment controls shall be installed and maintained along the limit of work. All impacts to resources areas are temporary and will be restored to original conditions.

The Department is satisfied that adequate measures will be taken to avoid, minimize and mitigate for the wetland impacts.

The 401 WQC application public notice was published in The Patriot Ledger on Tuesday, January 30, 2024, and the Department received no comments during the 21-day public comment period, which ended on February 20, 2024.

On December 29, 2023, the Massachusetts Environmental Protection Act (MEPA) Office formally responded to the Town of Weymouth's October 13, 2023 Request for Advisory Opinion in reference to the LCI Sewer Replacement Project. The MEPA Office determined that the project was not subject to further MEPA review as the Project does not meet or exceed MEPA review thresholds at 301 CMR 11.03.

Therefore, based on information currently in the record, the Department grants a Water Quality Certification for this project subject to certain conditions to maintain water quality, to minimize impacts on waters and wetlands, and to ensure compliance with appropriate state law. 314 CMR 9.00 is promulgated by the Department to carry out its statutory obligations to certify that proposed discharges of dredged or fill material, dredging, and dredged material disposal in waters of the United States within the Commonwealth will comply with the Surface Water Quality Standards and other appropriate requirements of state law. 314 CMR 9.00 implements and supplements 314 CMR 4.00: Massachusetts Surface Water Quality Standards and is a requirement of state law under 33 U.S.C. 1251. 314 CMR 9.00 implements and supplements 314 CMR 4.00: Massachusetts Surface Water Quality Standards by, without limitation: protecting the public health and restoring and maintaining the chemical, physical, and biological integrity of the water resources of the Commonwealth by establishing requirements, standards, and procedures for the following:

1. monitoring and control of activities involving discharges of dredged or fill material, dredging, and dredged material disposal or placement;

2. the evaluation of alternatives for dredging, discharges of dredged or fill material, and dredged material disposal or placement; and
3. public involvement regarding dredging, discharges of dredged or fill material, and dredged material placement, reuse or disposal.

314 CMR 9.00 applies to the discharge of dredged or fill material, dredging, and dredged material disposal activities in waters of the United States within the Commonwealth which require federal licenses or permits, and which are subject to state water quality certification under 33 U.S.C. 1251.

In accordance with 314 CMR 9.06(2) *no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will avoid and minimize potential adverse impacts to the bordering or isolated vegetated wetlands, land under water or ocean, or the intertidal zone. However, no such project may be permitted which will have any adverse effect on specified habitat sites of Rare Species.* As proposed by the applicant, the new interceptor will be relocated in the buffer zone. Construction timber matting, “swamp matting” will be used by the construction equipment at all times within the new sewer easement and within wetland resource areas when accessing the old interceptor manholes for bypass pumping, to remove portions of the existing interceptor and connect to the new utility. Erosion and sediment control is included with this work.

No work is proposed within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife published by the Natural Heritage and Endangered Species Program.

In accordance with 314 CMR 9.06(6) *stormwater discharges shall be provided with stormwater best management practices to attenuate pollutants and to provide a setback from the receiving water or wetland in accordance with the Stormwater Management Standards.* This project is a utility replacement, and as such is subject to the Stormwater Management Regulations as to the extent practicable pursuant to Standard 7, in 314 CMR 9.06(6)(a)7. The applicant’s stormwater report details the stormwater management plan in accordance with the Stormwater Management Standards 1 through 10.

In accordance with 314 CMR 9.06(7) *no discharge of dredged or fill material shall be permitted in the rare circumstances where the activity meets the criteria for evaluation but will result in substantial adverse impacts to the physical, chemical, or biological integrity of surface Waters of the Commonwealth.* The proposed project shall not result in any significant or permanent impacts to the physical, chemical, or biological integrity of the Mill Cove Stream—which is adjacent and parallel to the work proposed—nor the salt marsh or bordering vegetated wetland within the area of work proposed. The trenching for the installation of the interceptor will be at minimum depth and width for installation and located in the buffer zone. Matting shall be used in the resource areas and the entire project shall have erosion and sediment controls. Access into the salt marsh and bordering vegetated wetland will have matting, and bypass pumping within the resource areas shall be monitored and a containment area will be installed around each pump to protect

any possible refueling spills. Salt marsh and bordering vegetated wetland impacts are temporary in nature and shall be restored in accordance with the conditions of this Certification.

As noted above, the Department is authorized to impose the following conditions necessary to assure that the proposed project will comply with water quality requirements and will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other applicable requirements of state law.

- 1 The work shall conform to the following plans entitled:
 - *Lower Central Interceptor Improvements, Town of Weymouth, MA., Weymouth, MA Sheets G-1, G-2, C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, CD-1, and CD-2. Dated January, 2024, Prepared by Environmental Partners*
- 2 Any change to the plans and documents identified in Condition 1, or changes in methodologies approved in this Water Quality Certification shall require the applicant to notify MassDEP of the proposed change and receive written approval prior to undertaking any work not authorized by this permit.
- 3 The work approved in this Water Quality Certification shall be held to the Conditions set forth within the Order of Conditions dated March 14, 2024, by the Conservation Commission of Weymouth associated with this work, file number SE 081-1313.
- 4 No excavation activities causing vibration or disturbance shall occur during the Time-of-Year (TOY) restriction from March 1 – June 30 to protect sensitive life stages of rainbow smelt, as recommended in the DMF review letter dated January 30th, 2024.
- 5 A copy of this Certification and referenced plans and other documents shall be kept available on the work site during all phases of work.
- 6 Staff of MassDEP shall have the right to enter and inspect the area subject to this Certification at reasonable hours to evaluate compliance with the conditions stated in this Certification and may require the submittal of any data deemed necessary by MassDEP for that evaluation.
- 7 When possible, construction shall be undertaken when the ground is sufficiently frozen or otherwise stable and with the assistance of swamp mats to support the construction equipment within the wetland areas in order to avoid creating ruts. Swamp mats shall be lifted and set into place. There shall be no dragging of swamp mats. Any swamp mats shall be removed upon completion of the project. Wetland areas that are temporarily disturbed for access shall be restored in terms of vegetative cover and soil stability. In areas where disturbance occurs, soils shall be smoothed, seeded with a wet meadow mix and covered with a thin layer of straw mulch.
- 8 The wetlands restoration areas shall be replanted to ensure that surface area shall be at least 75% established with indigenous wetland plants within two growing seasons (310 CMR

10.55 (4)(b)6). Should the restoration areas fail to meet this standard, the Department may require additional measures necessary to achieve compliance.

- 9 Any tears, rips, breaks, or collapse of the erosion control barrier shall be repaired immediately (i.e., in no more than 24 hours).
- 10 Upon completion of the project and after the areas disturbed by construction activities have been stabilized, any erosion control measures shall be removed and disposed of in accordance with all applicable laws, regulations or ordinances.
- 11 This Certification remains in effect for the same duration as the federal permit that requires it or five years from the date of issuance of this Certification whichever comes first.
- 12 The applicant may request an amendment or extension of this Certification in accordance with 314 CMR 9.09(2) and (3), respectively.

Based upon its review, MassDEP is satisfied that with implementation by the proponent of the requirements of this Water Quality Certification, all practicable and feasible means and measures will be taken to avoid or minimize adverse impacts to wetland areas and related impacts to the environment associated with this project.

This certification does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations. Any changes made to the project as described in the 401 Water Quality Certification application, or supplemental documents will require further notification to the Department.

No activity may begin prior to the expiration of the appeal period or until a final decision is issued by the Department if an appeal is filed.

Notice of Appeal Rights:

A) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by the Department when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; any ten (10) persons of the Commonwealth pursuant to M.G.L. c.30A where a group member has submitted written comments during the public comment period; or (d) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c.30A, § 10, a Notice of

Claim must be made in writing, provided that the request is made by certified mail or hand delivery to the Department, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Docket Clerk
Office of Administrative Appeals
Department of Environmental Protection
100 Cambridge Street, Suite 900
Boston, MA 02114

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands and Waterways Program at:

Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, Massachusetts 02347

B) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with the Department's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 310 CMR 9.10(3):

- (a) the 401 Certification Transmittal Number and DEP Wetlands Protection Act File Number;
- (b) the complete name of the applicant and address of the project;
- (c) the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
- (d) if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
- (e) a clear and concise statement that an adjudicatory hearing is being requested;
- (f) a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the Department's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification; and
- (g) a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Environmental Management (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

C) Filing Fee and Address

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
P.O. Box 4062
Boston, Massachusetts 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. The Department may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship.

A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

Failure to comply with this certification is grounds for enforcement, including civil and criminal penalties, under MGL c.21 §42, MGL c.21A §16, 314 CMR 9.00, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

If you have further questions on this decision, please contact Jaclyn Sidman at (857) 208-6910, or by e-mail at Jaclyn.Sidman@mass.gov.

Sincerely,



Maissoun E. Reda, Chief
Wetlands Program
Bureau of Water Resources

MER/jgs

cc: Weymouth Conservation Commission

USACE

MA DMF



Massachusetts Department of Environmental Protection

Adjudicatory Hearing Fee Transmittal Form

IMPORTANT! This form is intended for fee transmittal only. The contents of a request for an adjudicatory appeal (Notice of Claim) are established at 310 CMR 1.01(6) and the substantive statutes and regulations governing the Department's action.

A. Person/Party Making Request

1. Name and address of person or party making request:

Name - If appropriate, name group representative

Street Address

City

State

Zip Code

2. Project Information:

Street Address

City

State

Zip Code

DEP File or ID Number

\$

Amount of filing fee attached

Email Address

B. Applicant (if applicable)

1. Name and address of applicant:

Name - If appropriate, name group representative

Street Address

City

State

Zip Code

Email Address

C. Instructions

1. Send this form and check or money order of \$100.00 payable to the Commonwealth of Massachusetts to the MassDEP Lockbox at:

Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

2. Send a **copy** of this form and a **copy** of the check or money order with the Request for Adjudicatory Appeal (Notice of Claim) to:

Case Administrator
Office of Appeals and Dispute Resolution
One Winter Street
Boston, MA 02108

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





重要 महत्वपूर्ण σημαντικός
Important
lywntlnp quan trọng مهم



Communication for Non-English-Speaking Parties

This document is important and should be translated immediately.

If you need this document translated, please contact MassDEP's Director of EJ at the telephone number listed below.

Español Spanish

Este documento es importante y debe ser traducido de inmediato. Si necesita este documento traducido, comuníquese con la Directora de Diversidad de MassDEP al número de teléfono que aparece más abajo.

Português Portuguese

Este é um documento importante e deve ser traduzido imediatamente. Se precisar de uma tradução deste documento, entre em contato com o Diretor de Diversidade da MassDEP nos números de telefone listados abaixo.

繁體中文 Chinese Traditional

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼聯絡 MassDEP 多元化負責人。

簡體中文 Chinese Simplified

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與 MassDEP 的多元化主任聯繫。

Ayisyen Kreyòl Haitian Creole

Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradwi l imedyatman. Si ou bezwen dokimar sa a tradwi, tanpri kontakte Direktè Divèsite MassDEP la nan nimewo telefòn endike anba.

Việt Vietnamese

Tài liệu này rất quan trọng và cần được dịch ngay lập tức. Nếu quý vị cần dịch tài liệu này, xin liên lạc với Giám đốc Đa dạng của MassDEP theo các số điện thoại ghi dưới đây.

ប្រទេសកម្ពុជា Khmer/Cambodian

ឯកសារនេះគឺសំខាន់ហើយគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវការឲ្យគេបកប្រែឯកសារនេះ:

សូមទាក់ទងមកនាយកផ្នែកពិពិធកម្មរបស់ MassDEP តាមលេខទូរស័ព្ទខាងក្រោម។

Kriolu Kabuverdianu Cape Verdean

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Contact Deneen Simpson 857-406-0738

Massachusetts Department of Environmental Protection

100 Cambridge Street 9th Floor Boston, MA 02114

TTY# MassRelay Service 1-800-439-2370 • <https://www.mass.gov/environmental-justice>

(Version revised 4.21.2023) 310 CMR 1.03(5)(a)

Русский Russian

Это важный документ, и он должен быть безотлагательно переведен. Если вам нужен перевод данного документа, пожалуйста, свяжитесь с директором по вопросам многообразия (Diversity Director) компании MassDEP по указанному ниже телефону.

العربية Arabic

هذه الوثيقة مهمة ويجب ترجمتها على الفور. إذا كنت بحاجة إلى هذه الوثيقة مترجمة، يرجى الاتصال بمدير التنوع PMassDE على أرقام الهواتف المدرجة أدناه.

한국어 Korean

이 문서는 중요하고 즉시 번역해야 합니다. 이 문서의 번역이 필요하시다면, 아래의 전화 번호로 MassDEP의 다양성 담당 이사에 문의하시기 바랍니다.

հայերեն Armenian

Այս փաստաթուղթը կարևոր է և պետք է անմիջապես թարգմանվի:
Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանել, դիմեք MassDEP-ի բազմազանության տնօրենին ստորև նշված հեռախոսահամարով:

فارسی Farsi Persian

این سند مهم است و باید فوراً ترجمه شود.
اگر به ترجمه این سند نیاز دارید، لطفاً با مدیر بخش تنوع نژادی MassDEP به شماره تلفن ذکر شده در زیر تماس بگیرید.

Français French

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, veuillez communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.

Deutsch German

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Sofern Sie eine Übersetzung dieses Dokuments benötigen, wenden Sie sich bitte an den Diversity Director MassDEP unter der unten aufgeführten Telefonnummer.

Ελληνική Greek

Το παρόν έγγραφο είναι σημαντικό και θα πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του παρόντος εγγράφου, παρακαλούμε επικοινωνήστε με τον Διευθυντή Διαφορετικότητας του MassDEP στους αριθμούς τηλεφώνου που αναγράφονται παρακάτω.

Italiano Italian

Comunicazione per parti che non parlano inglese. Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, potete contattare il Direttore di Diversità di MassDEP al numero di telefono elencato di seguito.

Język Polski Polish

Dokument ten jest ważny i powinien zostać natychmiast przetłumaczony. Jeśli potrzebujesz przetłumaczonej wersji dokumentu, prosimy o kontakt z dyrektorem ds. różnorodności MassDEP pod jednym z numerów telefonu wymienionych poniżej.

हिन्दी Hindi

यह दस्तावेज महत्वपूर्ण है और इसका तुरंत अनुवाद किया जाना चाहिए. यदि आपको इस दस्तावेज़ का अनुवाद करने की आवश्यकता है, तो कृपया नीचे सूचीबद्ध टेलीफोन नंबरों पर मासडेपस डाइवर्सिटी के निदेशक से संपर्क करें.

Contact Deneen Simpson 857-406-0738

Massachusetts Department of Environmental Protection
100 Cambridge Street 9th Floor Boston, MA 02114

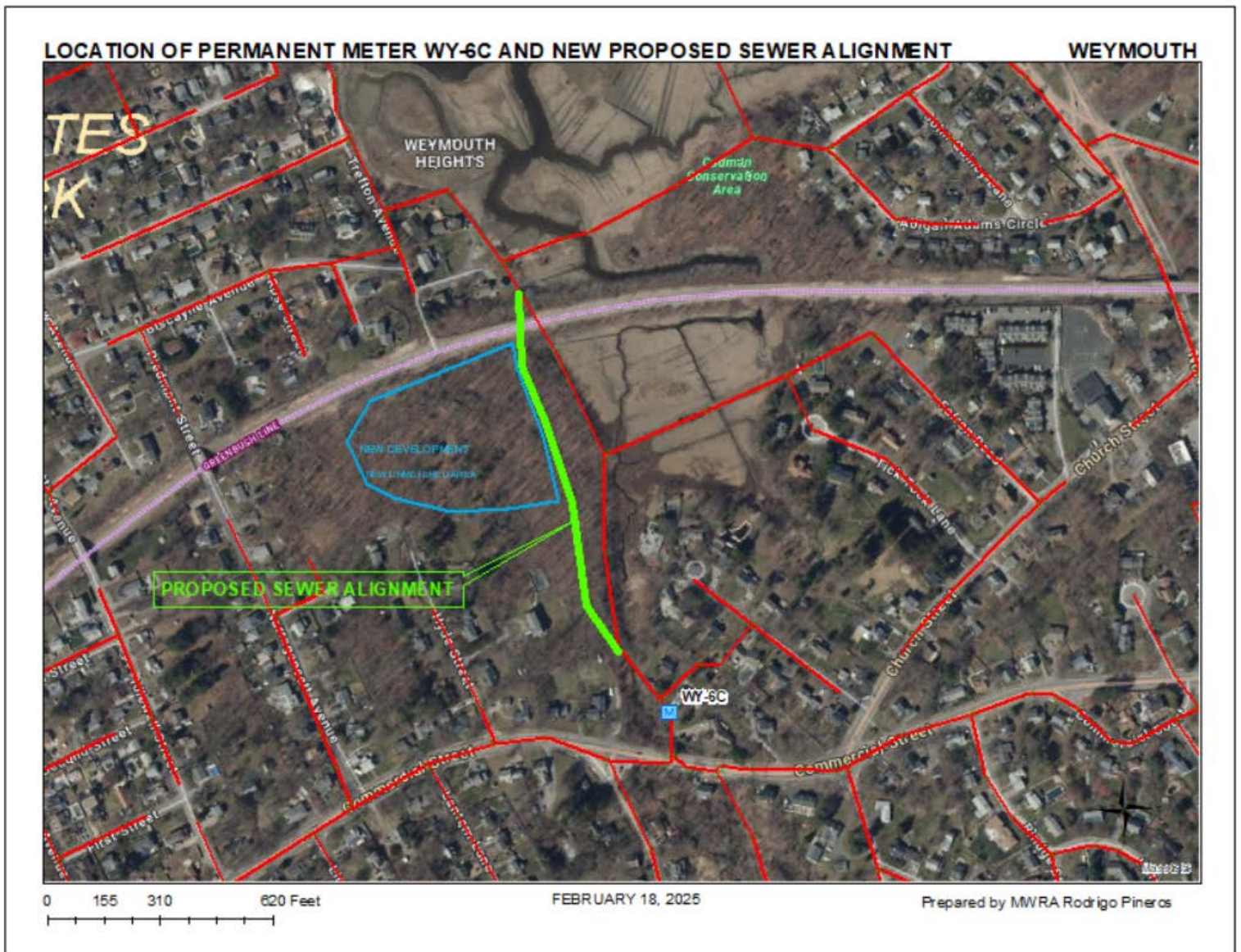
TTY# MassRelay Service 1-800-439-2370 • <https://www.mass.gov/environmental-justice>
(Version revised 4.21.2023) 310 CMR 1.03(5)(a)

APPENDIX H

Sewer Flow Records

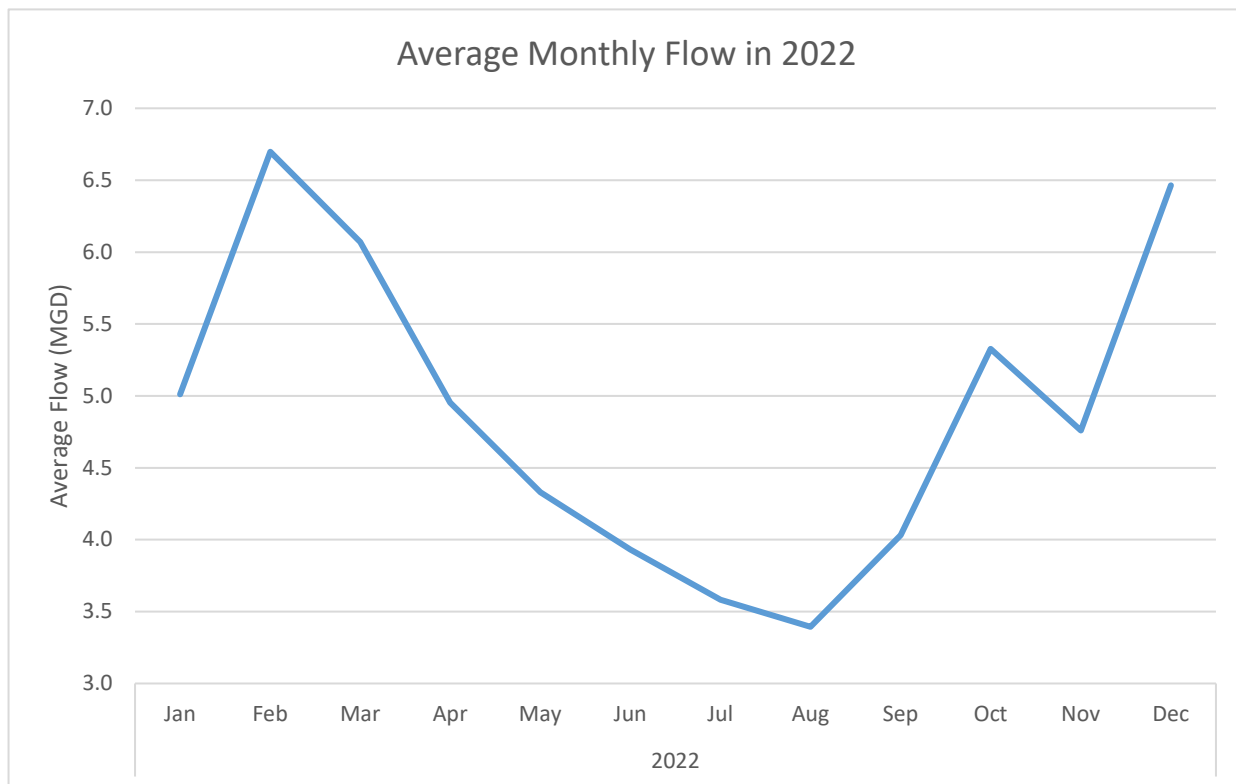
Flow Records Summary

Year	Minimum Flow (MGD)	Maximum Flow (MGD)	Average Flow (MGD)
2022	1.309	10.315	4.87
2023	2.052	13.348	5.091
2024	1.113	15.561	4.641





Month	Average Flow (MGD)
2022	4.87
Jan	5.01
Feb	6.70
Mar	6.07
Apr	4.95
May	4.33
Jun	3.93
Jul	3.58
Aug	3.39
Sep	4.03
Oct	5.33
Nov	4.76
Dec	6.47
Yearly Average	4.87

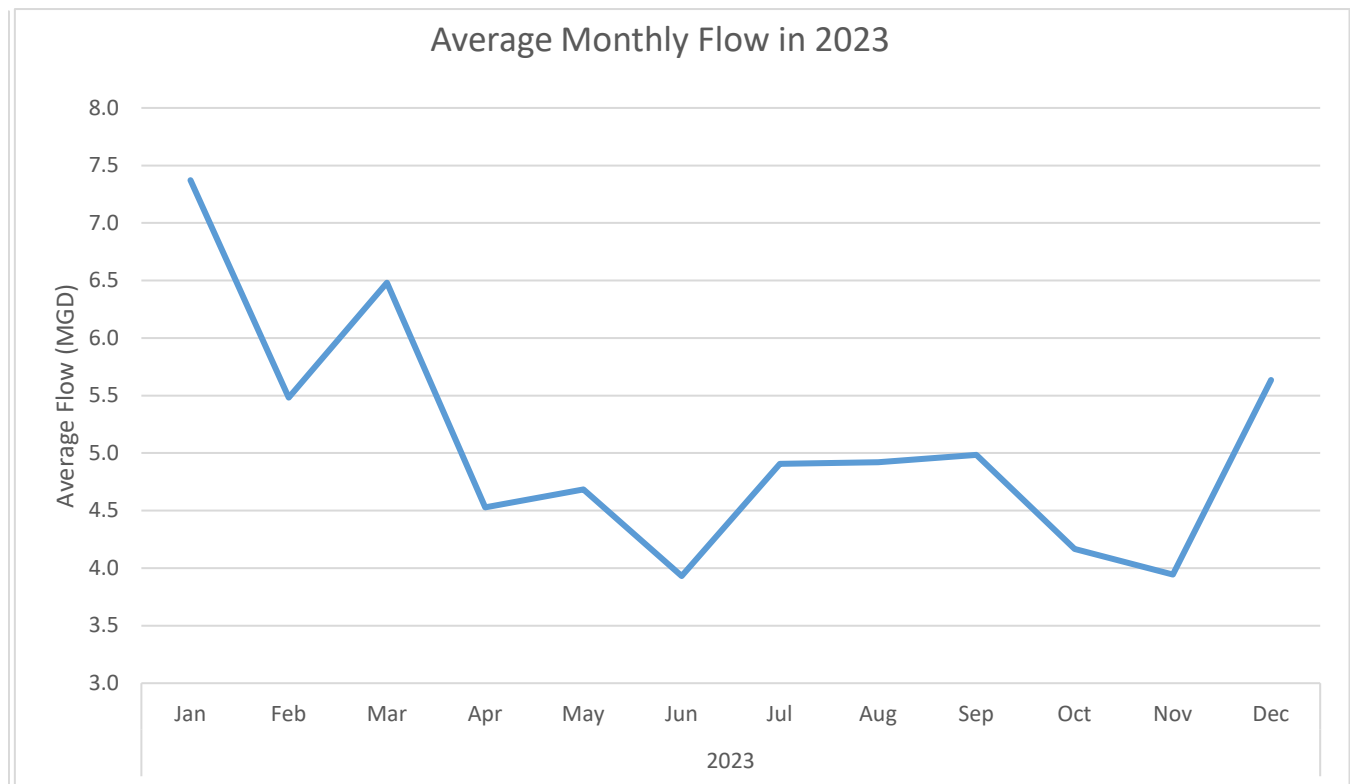




Appendix H
Sewer Flow Records

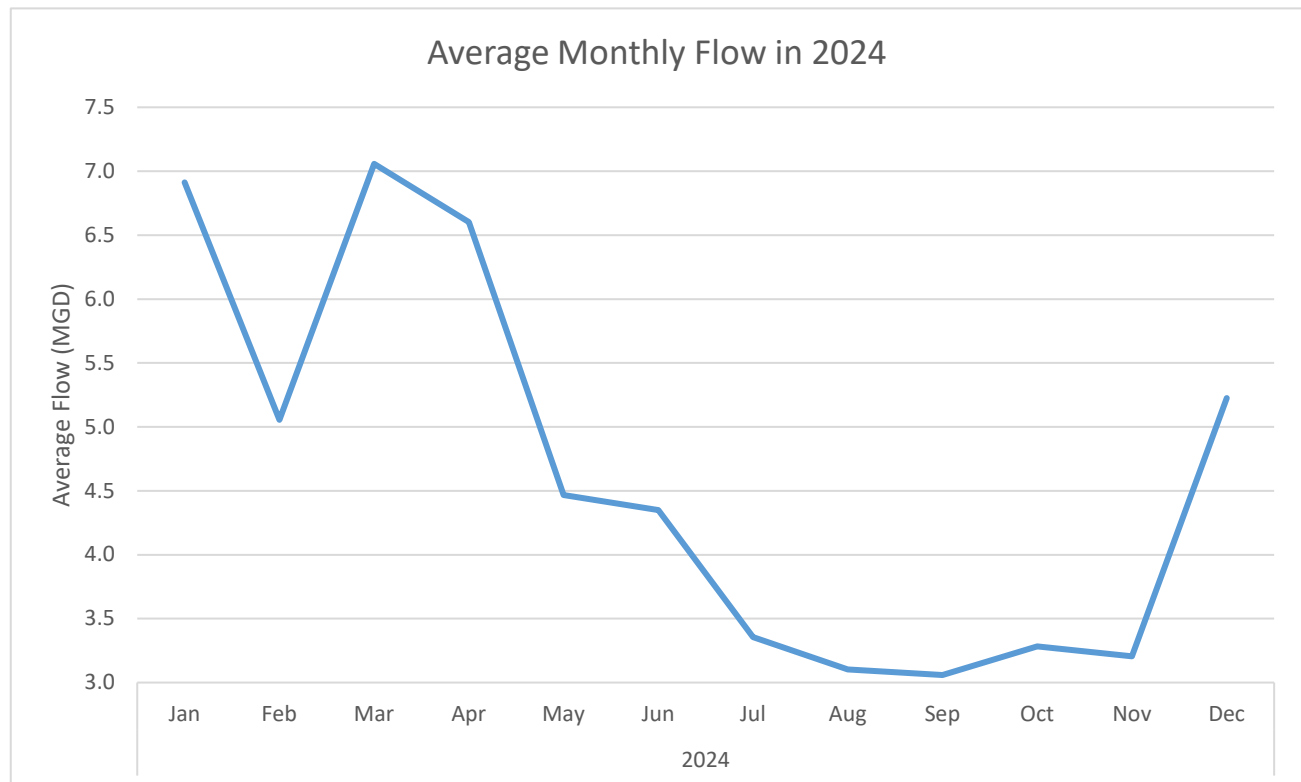
MWRA Meter WY_6C

Month	Average Flow (MGD)
2023	5.09
Jan	7.37
Feb	5.48
Mar	6.48
Apr	4.53
May	4.68
Jun	3.93
Jul	4.91
Aug	4.92
Sep	4.99
Oct	4.17
Nov	3.95
Dec	5.63
Yearly Average	5.09

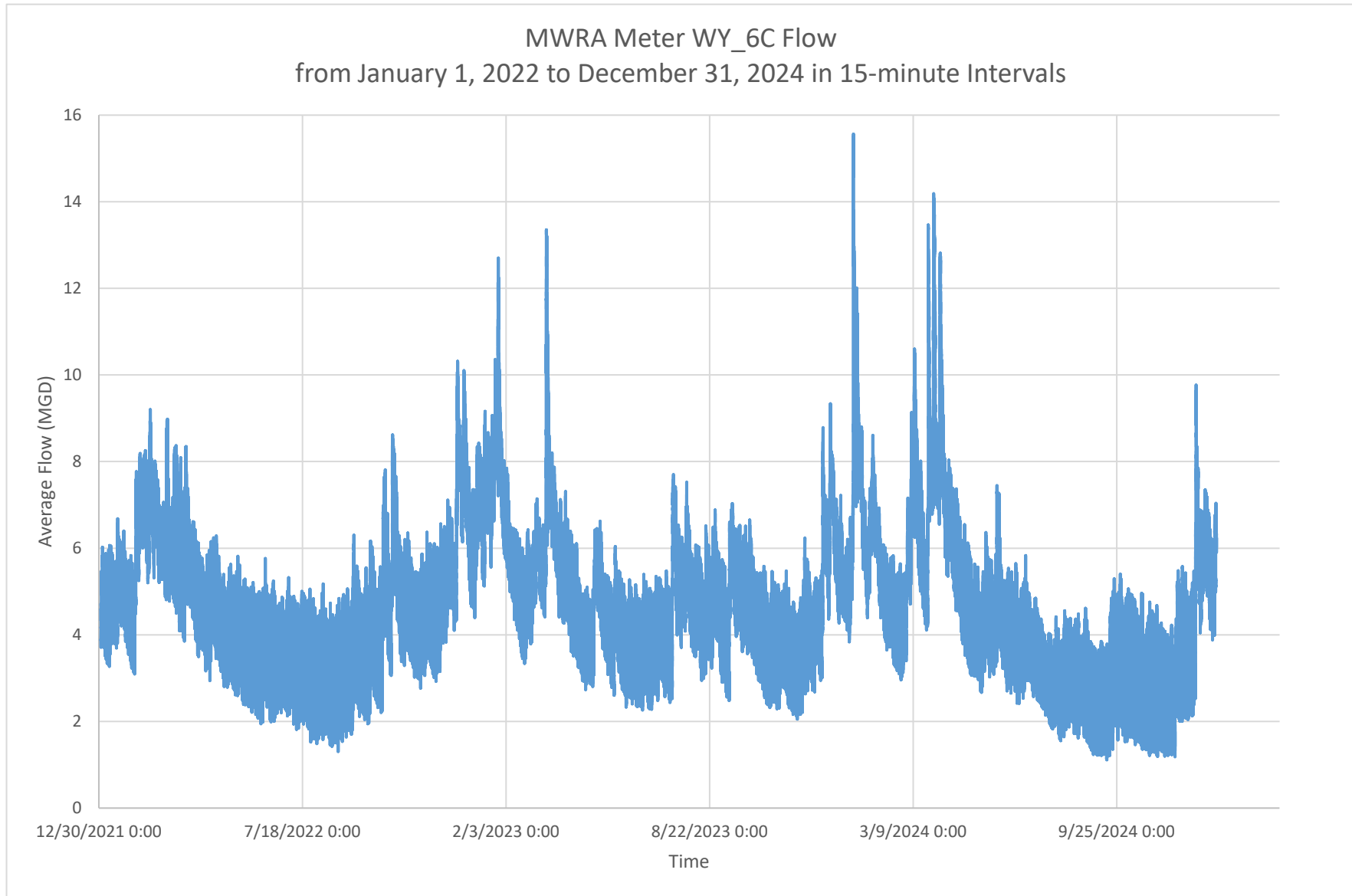




Month	Average Flow (MGD)
2024	4.64
Jan	6.91
Feb	5.06
Mar	7.06
Apr	6.60
May	4.47
Jun	4.35
Jul	3.36
Aug	3.10
Sep	3.06
Oct	3.28
Nov	3.21
Dec	5.22
Yearly Average	4.64



*During the summer months, flow data was calculated using Manning's equation due to the site being inaccessible.



APPENDIX I

MBTA Draft License and Requirements

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

LICENSE FOR ENTRY | MBTA – [00000]

RAILROAD PROPERTIES

[MUNICIPALITY], MASSACHUSETTS

[COMPANY.NAME]

1. The License for Entry

The Massachusetts Bay Transportation Authority, a body politic and corporate and a political subdivision of the Commonwealth of Massachusetts, established and existing pursuant to Chapter 161A of the Massachusetts General Laws, with a usual place of business at 10 Park Plaza, Boston, Massachusetts (the “MBTA”), hereby grants to [ENTITY.NAME], a [COMPANY.TYPE], with a usual place of business at [_____] (“Licensee”), the right and privilege to enter onto the Premises (as defined in Section 2.5 below) solely to conduct the Scope of License (as defined in Section 2.6 below), subject to the terms and conditions of this License for Entry.

2. General Conditions

Among the terms and conditions of this License for Entry are included the following General Conditions:

2.1 Effective Date: _____, 2025

2.2 Licensee: [ENTITY.NAME]

2.3 Term: From the Effective Date to _____, 2025; except that the MBTA may terminate this License for Entry with thirty (30) days written notice.

2.4 Fees:

Administrative Fee: \$1,000.00 paid with the application for this License for Entry.

License Fee: \$1,000.00 to be paid contemporaneously with the execution of the License for Entry.

Design and Construction Plan Review Fee: \$1,600.00 paid in accordance with Section 4.1(h) below.

2.5 Premises: Those certain areas of the [PROP.DESCRPTION] in [MUNICIPALITY], Massachusetts, as more fully described/shown in Exhibit A, attached hereto and incorporated herein, but only to the extent that use of such property is reasonably necessary to permit Licensee to conduct the activities described in Section 2.6 below.

2.6 Scope of License: Subject to, and in accordance with, the terms and conditions of this License for Entry, and the plans and/or documentation attached as Exhibit A, Licensee may [SCOPE.OF.WORK]. No other investigations or activities of any kind may be performed on the Premises or any other property of the MBTA. Licensee shall have the right to permit its employees, contractors, and agents to use the Premises as permitted

hereunder and acting by and through Licensee, subject to all of the terms and conditions of this License for Entry.

Licensee understands and agrees to the following terms and conditions:

1. Licensee shall adhere to the requirements set forth in the MBTA's Procedures for Environmental Data Collection and Monitoring Well Management on MBTA-Owned Property, hereto attached as Exhibit C and incorporated herein by reference.
2. Licensee shall adhere to the terms and conditions of the ~~Choose an item.~~ correspondence dated [MONTH/DAY/YEAR], hereto attached as ~~Choose an item.~~ and incorporated herein by reference.
3. Licensee shall adhere to the terms and conditions of the ~~Choose an item.~~ correspondence dated [MONTH/DAY/YEAR], hereto attached as ~~Choose an item.~~ and incorporated herein by reference.
4. Licensee shall adhere to the terms and conditions of the ~~Choose an item.~~ correspondence dated [MONTH/DAY/YEAR], hereto attached as ~~Choose an item.~~ and incorporated herein by reference.

In the event of a conflict between the conditions stated in this Section 2.6 and other provisions of this License for Entry, whichever provisions are more restrictive of Licensee or impose a higher standard on Licensee shall control.

2.7 Notices:

The MBTA:

The MBTA Real Estate Department
Massachusetts Bay Transportation Authority
10 Park Plaza, Suite 5720
Boston, Massachusetts 02116
Attn: Deputy Chief Real Estate Officer

and

The MBTA Capital Delivery Department
10 Park Plaza, Suite 5170
Boston, Massachusetts 02116
Attn: Assistant General Manager

and

The MBTA Railroad Operations Department
Engineering and Maintenance
32 Cobble Hill Road

Somerville, Massachusetts 02143
Attn: Director of Engineering

and

The MBTA Choose an item. Line Operations Department
45 High Street
Boston, Massachusetts 02110
Attn: Division Chief

and

Keolis Commuter Services, LLC ("KCS")
32 Cobble Hill Road
Somerville, Massachusetts 02143
Attn: John Connors

and

CSX Transportation, Inc. ("CSX")
500 Water Street
Jacksonville, Florida 32202
Attn: Mark E. Austin

and

Pan Am Railways, Inc. ("Pan Am")
1700 Iron Horse Park
North Billerica, Massachusetts 01862

and

National Railroad Passenger Corporation ("Amtrak")
30th Street Station, Box 64
2955 Market Street
Philadelphia, Pennsylvania 19104
Attn: Kate McGrath
215-349-1750

and

Massachusetts Realty Group
20 Park Plaza, Suite 1120
Boston, Massachusetts 02116
Attn: MBTA License Management

LICENSEE:

COMPANY
ADDRESS
CITY, STATE ZIP

Attn: CONTACT

3. Consideration

The rights contained in this License for Entry are granted for good and valuable consideration, the sufficiency of which is hereby acknowledged.

4. Terms and Conditions of License for Entry

This License for Entry is subject to the following terms and conditions:

4.1 Scope of Activity

(a) Scope of Activity:

The Scope of Activity is the Scope of License (Section 2.6) as modified by the terms of this License for Entry, including, without limitation, Exhibit B attached hereto and incorporated herein. Licensee shall minimize the disruption to and alteration of the Premises and, as soon as possible after each entry onto the Premises, shall return the Premises to the condition existing immediately prior to the initiation of the Scope of Activity and entry hereunder; except as specifically authorized under the Scope of License.

Except pursuant to an approved Access Plan, defined in Exhibit B, attached hereto and incorporated herein, or in case of emergency, Licensee shall provide at least ten (10) days' prior written notice of its desire to enter the Premises to the MBTA's applicable operations department(s), including [MBTA's Railroad Operations Department and MBTA's Choose an item. Line Operations Department], in accordance with this License for Entry at the address(es) noted above and shall also make arrangements at least ten (10) days in advance with the applicable Railroad Companies (as defined below) for access. The MBTA and the Railroad Companies (as defined below) may have an observer present at all times when Licensee is present on the Premises. See Exhibit B for required notice from Licensee when Licensee needs access because of an emergency. Licensee shall do all work in accordance with the Plan described in Exhibit B.

(b) Utilities:

Licensee acknowledges that there may be surface and subsurface utilities on and adjacent to the Premises and agrees to exercise extreme caution in performance of the Scope of Activity. Licensee shall comply with Massachusetts General Laws, Chapter 82, Section 40 (said statute also known as the "Dig Safe" law) and the regulations promulgated pursuant thereto including but not limited to the Code of Massachusetts Regulations, more particularly, 220 CMR 99.00 et seq. To the extent the MBTA, the Railroad Companies (as defined below), or parties acting on behalf of any of them, locate and mark railroad utilities in the railroad rights of way and appurtenant thereto, Licensee shall be responsible for payment to such parties for such services which may include, but not be limited to, locating and marking utilities, facilities and appurtenances thereto serving the railroad and transit line(s) or used in connection with services or operations of the MBTA and/or the Railroad Companies (as defined below). Any damage to any utilities on or near the Premises caused by Licensee shall be the sole responsibility of Licensee. If Licensee does not immediately repair any utilities it has damaged, the MBTA, without being under any obligation to do so and without waiving Licensee's obligation hereunder, may repair any utilities damaged by Licensee immediately and without notice in case of emergency. In the event the MBTA exercises such right, Licensee shall pay to the

MBTA immediately upon demand all of the MBTA's cost of performing such repairs plus a fee equal to twenty-five percent (25%) of the MBTA's cost of performing such repairs to reimburse the MBTA for its administrative costs.

(c) Subordination to the MBTA's Operating Requirements:

The work permitted hereby shall be subordinate to the requirements of the MBTA in maintaining and operating a transportation system and may be stopped or delayed, at any time, in response to each requirement. The MBTA shall not be responsible for any damages incurred by Licensee as a result of any such work stoppage, delay or required relocation.

(d) Environmental Cooperation:

If for any reason Licensee is not responsible for Hazardous Materials, defined below, on the Premises then Licensee agrees to cooperate with the MBTA in the determination of the party liable for the remediation of the Premises under applicable Federal and/or state law. Such cooperation may include the temporary adjustment of the rights granted to Licensee hereunder. The MBTA shall not be responsible for any damages incurred by Licensee as a result of such temporary adjustment. "Hazardous Materials" shall mean "oil" or "hazardous materials", as those terms are defined in Massachusetts General Laws Chapter 21E ("Chapter 21E") and the regulations promulgated pursuant thereto, the Massachusetts Contingency Plan, 310 CMR 40.0000 et seq. (the "MCP").

(e) Remediation Obligation of Licensee:

Whenever by law or the terms of this License for Entry, Licensee is responsible for remediation of Hazardous Materials on MBTA property, Licensee, upon written demand of the MBTA, shall conduct, at Licensee's sole cost and expense (or, at the MBTA's election, reimburse the MBTA for the cost and expense incurred by the MBTA in connection with the MBTA's conduct of), all response actions required by Chapter 21E and the MCP with respect to the Hazardous Materials (including the hiring of a Licensed Site Professional). Any such response action, if performed by Licensee, shall be performed in accordance with Chapter 21E, the MCP, any other applicable statutes and regulations, and in accordance with plans and specifications approved by the MBTA, shall be completed in a timely manner to the reasonable satisfaction of the MBTA, and shall allow the MBTA to use the Premises, and/or adjacent or contiguous property owned by the MBTA, for its present use and for any future transportation use. Licensee shall also be responsible for the reasonable costs incurred by the MBTA in hiring consultants (including a Licensed Site Professional) to review, supervise and inspect any plans, specifications, proposed method of work, installation, operation and results.

(f) Notice of Project Commencement and Completion:

Upon commencement and completion of its work, Licensee shall provide written notice to the MBTA and the Railroad Companies (as defined below) at the notice addresses set forth in Section 2.7.

(g) Evidence of Financial Responsibility:

Prior to commencement of Licensee's activities hereunder, Licensee shall provide evidence to the MBTA's reasonable satisfaction that Licensee has sufficient financial resources available to

discharge any anticipated obligations hereunder. Such resources may be in the form of Licensee's net worth, insurance coverage, a bond or such other financial security as may be acceptable to the MBTA in form and amount.

(h) Plan Review Costs:

In addition to the Fees allocated in Section 2.4 above, Licensee shall also be responsible for any additional costs that may be incurred by the MBTA for Design and Construction Plan Review within thirty (30) days of being invoiced for same. Such costs and Fees are in addition to the Administrative Fee and the License Fee, and are included within the Licensee's indemnity obligations in Section 4.2(a) below.

(i) Settlement, Heaving or Lateral Movement

Licensee shall be responsible for any settlement, heaving or lateral movement caused to the roadbed, right-of-way and/or tracks, facilities and appurtenances of the MBTA or the Railroad Companies, arising from or as a result of the Scope of License or other Licensee activities at the Premises from the date of completion of the Scope of License, and Licensee agrees to pay the MBTA and/or the Railroad Companies the full cost and expense of repair or restoration to the MBTA's and/or Railroad Companies' facilities, promptly upon receipt of invoices therefore.

4.2 Indemnification and Release of the MBTA

(a) Licensee shall indemnify, defend (at the option of the MBTA) and save the MBTA, [SPECIFIC.RAILROAD.COMPANIES KCS, Amtrak, CSX, Pan Am], and any other company operating on the rights-of-way (collectively, except for the MBTA, the "Railroad Companies"; and individually, each a "Railroad Company") harmless from and against any and all liabilities, losses, damages, costs, expenses (including reasonable attorneys' expenses and fees), causes of action, suits, claims, demands or judgments of any nature whatsoever including, without limitation, those related to Hazardous Materials that may be imposed upon, incurred by, or asserted against the MBTA or the Railroad Companies by reason of any of the following occurrences:

- (1) the activities of Licensee hereunder or the exercise by Licensee of any rights or privileges hereby granted; or
- (2) the presence, discovery or revealing of any pre-existing Hazardous Materials on the Premises (or other property of the MBTA adjacent to the Premises) (i) which discovery is a result of Licensee's activities hereunder; (ii) where said Hazardous Materials are present because of Licensee's previous occupancies of the Premises, whether those occupancies were unauthorized or permitted pursuant to prior agreements between the parties; or (iii) where those pre-existing Hazardous Materials migrated from land now or previously owned, leased, occupied or operated by Licensee or for which Licensee is a potentially responsible party as defined under Chapter 21E; or
- (3) the placement or accidental release of any Hazardous Materials onto the Premises (or other property of the MBTA adjacent to the Premises) by Licensee or its employees, agents, contractors or consultants or by the employees, agents, or consultants of Licensee's contractors or subcontractors; or

- (4) any use, condition or occupation of the Premises or any part thereof by Licensee; or
- (5) any failure of Licensee to perform or comply with any of the terms hereof, or of any contracts, agreements or restrictions, statutes, laws, ordinances or regulations affecting the activities or any part thereof.

In subsection (2) above, Licensee's previous occupancies of the Premises include occupancies by the predecessors in interest of Licensee.

- (b) Licensee has inspected the Premises and decided that the Premises are suitable for the uses Licensee contemplates. Licensee assumes all the risk of entry on to the Premises.
- (c) Licensee hereby releases the MBTA and the Railroad Companies from any responsibility for Licensee's losses or damages related to the condition of the Premises, and Licensee covenants and agrees that it will not assert or bring, nor cause any third-party to assert or bring, any claim, demand, lawsuit or cause of action (whether by way of original claim, cross claim, counterclaim, contribution claim, indemnification claim, third-party claim or any other claim) (hereinafter "Claims") against the MBTA or the Railroad Companies, including, without limitation, claims for response actions, response costs, assessments, containment, removal and remedial costs, governmental oversight charges, including any overhead or response action costs incurred or assessed by DEP, fines or penalties, permit and annual compliance fees, reasonable attorney and expert fees, natural resource damages, property damages, including diminution in property value claims, and personal injury damages and damages related to a person's death relating to, or arising from, the condition of the Premises.

Licensee shall obtain a written release of liability similar to the one in this Section 4.2(c) and including the language of Section 4.2(d) in favor of the MBTA and the Railroad Companies from each of Licensee's consultants and contractors before they enter onto the Premises.

- (d) In clarification of the above release and covenants of defense and indemnification, and not in limitation of them, Licensee shall indemnify, defend (at the option of the MBTA) and save the MBTA and the Railroad Companies harmless from and against any and all liabilities, losses, damages, costs, expenses (including reasonable attorneys' expenses and fees), causes of action, suits, claims, demands or judgments related to the injury, illness or death of any employee of Licensee or of an employee of Licensee's contractors or consultants; except if the "Claim" arose because of the gross negligence or willful misconduct of the MBTA or the Railroad Companies. It shall not be grossly negligent to allow access to the Premises that are in substantially the condition they were in when Licensee inspected the Premises before accepting this License for Entry.
- (e) Licensee shall be notified, in writing, by the MBTA and each of the affected Railroad Companies of the assertion of any claim against it that Licensee has agreed to indemnify above (the "Indemnified Claim").

- (1) If the MBTA decides to itself conduct the defense of an Indemnified Claim against it or to conduct any other response itself, Licensee shall reimburse the MBTA for all costs and expenses (including, without limitation, reasonable attorneys' fees and expenses) incurred by the MBTA in connection with the MBTA's defense of the Indemnified Claim against it and/or the conduct of all response actions, including, without limitation, those required by Chapter 21E and the MCP. The settlement or compromise of any Indemnified Claim shall not include the admission of guilt (or comparable plea), wrongdoing or negligence or the permitting or imposition of civil or criminal penalties or indictments, or the entering of consent decrees or orders of any kind by the MBTA on behalf of Licensee or any other action that would materially prejudice the rights of Licensee without Licensee's express written approval. Licensee shall cooperate fully and promptly with the MBTA in the defense of any Indemnified Claim. This same right of self-defense and the right to Licensee reimbursement shall apply to each of the Railroad Companies that has an Indemnified Claim against it.
- (2) If the MBTA decides to have Licensee defend the Indemnified Claim or handle the response action, the MBTA shall notify Licensee of that decision in writing and Licensee shall bear the entire cost thereof and shall have sole control of the defense of any Indemnified Claim and all negotiations for its settlement or compromise provided that the MBTA is fully indemnified by Licensee and provided further that the settlement or compromise shall not include the admission of guilt (or comparable plea), wrongdoing or negligence or the permitting or imposition of civil or criminal penalties or indictments, or the entering of consent decrees or orders of any kind by Licensee on behalf of the MBTA or any other action that would materially prejudice the rights of the MBTA without the MBTA's express written approval. The MBTA shall cooperate with Licensee in the defense of any Indemnified Claim. If any of the Railroad Companies want Licensee to defend it against an Indemnified Claim, then they must agree to this Section 4.2(e)(2).

If any response action due to the presence of Hazardous Material or the threat of release of Hazardous Waste onto the Premises (or other property of the MBTA which abuts the Premises), is performed by Licensee, the response action shall be performed in accordance with Section 4.1(e).

- (f) Licensee and contractor shall provide to the MBTA financial assurance guaranteeing Licensee's performance of the obligations of this License for Entry in a form satisfactory to the MBTA.

For purposes of this Section 4, Licensee shall include Licensee and its directors, officers, employees, agents, successors and assigns and the MBTA shall include the MBTA and its directors, officers, employees, agents, successors and assigns.

The provisions of Sections 4.1 and 4.2 shall survive the termination or expiration of this License for Entry.

4.3 Insurance

Prior to entry hereunder, Licensee and its consultants and contractors shall provide the MBTA, [SPECIFIC.RAILROAD.COMPANIES KCS, Amtrak, CSX, Pan Am], and the Railroad Companies with a certificate or certificates of insurance and shall, during the Term hereof,

renew and replace any expired certificate, evidencing the insurance of the activities permitted hereunder, and Licensee's covenant of indemnification hereinabove, with companies that are reasonably acceptable to the MBTA, as stated below, in which the MBTA and others hereinafter specified are either additional insureds as their interests may appear or named insureds and which provide minimum liability coverage as follows:

(a) Commercial General Liability Insurance:

Insuring Licensee, the MBTA, the Railroad Companies, the Premises, and all activities of Licensee permitted pursuant to this License for Entry, as well as Licensee's indemnification obligations contained herein, with minimum liability coverage for personal injury, bodily injury and property damage with limits not less than One Million Dollars (\$1,000,000) per occurrence and Two Million Dollars (\$2,000,000) in aggregate. Such insurance shall be written on an occurrence basis (as opposed to a claims made basis). This policy shall name the MBTA and the Railroad Companies as additional insureds. This policy shall provide coverage on a primary and non-contributory basis for the MBTA and the Railroad Companies. The policy shall contain a clause waiving the right of subrogation in favor of the MBTA and the Railroad Companies. This policy must contain endorsement(s) or language, which must be stated on the certificate of insurance, providing coverage equivalent to the coverage provided by ISO form CG 24 17 10 01.

(b) Workers' Compensation and Employers' Liability Insurance:

Insuring all persons employed by Licensee in connection with any work done on or about the Premises with respect to which claims for death or bodily injury could be asserted against the MBTA, including (i) Workers' Compensation Insurance providing statutory coverage as required by the Commonwealth of Massachusetts, and (ii) Employers' Liability Insurance coverage with limits of not less than One Million Dollars (\$1,000,000) per accident. Each of Licensee's contractors, subcontractors, and consultants performing work on or about the Premises shall have similar policies covering their employees. All policies of insurance required by this Section 4.3 (b) must contain a clause waiving the right of subrogation in favor of the MBTA and the Railroad Companies.

(c) Automobile Liability Insurance:

Automobile liability insurance with limits of not less than One Million Dollars (\$1,000,000) covering all owned, non-owned, hired, rented or leased vehicles of Licensee, its employees, officers, subcontractors and consultants that are used in the activities permitted hereunder. Such insurance shall be written on an occurrence basis (as opposed to a claims made basis). This policy shall name the MBTA and the Railroad Companies as additional insureds. This policy shall provide coverage on a primary and non-contributory basis for the MBTA and the Railroad Companies. This policy must contain endorsement(s) or language, which must be stated on the certificate of insurance, providing coverage equivalent to the coverage provided by ISO form CA 20 70 10 01.

(d) Umbrella Liability Insurance:

Umbrella liability insurance with limits of not less than Ten Million Dollars (\$10,000,000) providing excess coverage over all limits and coverage noted in paragraph (a) and paragraph (c) above. Such insurance shall be written on an occurrence basis (as opposed to a claims

made basis). This policy shall name the MBTA and the Railroad Companies as additional insureds. This policy shall provide coverage on a primary and non-contributory basis for the MBTA and the Railroad Companies. The policy shall contain a clause waiving the right of subrogation in favor of the MBTA and the Railroad Companies. This policy must contain endorsement(s) or language, which must be stated on the certificate of insurance, providing coverage equivalent to the coverage provided by ISO form CU 24 09 03 05.

(e) Insurance during Construction and Installation:

Licensee shall procure or cause to be procured builder's all risk insurance during any period when a construction project is being undertaken by or on behalf of Licensee on the Premises.

(f) Railroad and Transit Protective Liability Insurance:

In the event that any work occurs within fifty (50) feet of an active right-of-way or if any work of any kind by Licensee poses a risk to foul an active right-of-way, Licensee shall procure Railroad Protective Liability Insurance insuring the MBTA and the Railroad Companies with limits of not less than Five Million Dollars (\$5,000,000) for all damages arising out of bodily injuries to or death of one (1) person, and, subject to that limit for each person, a total limit of Ten Million Dollars (\$10,000,000) for all damages arising out of bodily injury to or death of two (2) or more persons in any one (1) accident. **[NOTE: For grants of rights for non-invasive and low risk activities, minimum coverage limits may be reduced to Two Million Dollars (\$2,000,000) and Six Million Dollars (\$6,000,000).]** The MBTA and the Railroad Companies shall be "first named insureds" on the Railroad Protective Liability Insurance Policy. ~~Choose an item.~~ shall be provided with an original policy of Railroad Protective Liability Insurance and the MBTA and remaining Railroad Companies shall be provided with a certificate of insurance.

The MBTA may require reasonable increases in limits of the above insurance coverages from time to time. The required insurance coverages hereinbefore specified shall be placed with insurance companies licensed by the Massachusetts Division of Insurance to do business in the Commonwealth of Massachusetts and having a Best's rating of A- or better, shall be kept in full force and effect at all times, shall be primary and non-contributory to any insurance or self-insurance maintained by the MBTA and the Railroad Companies, and shall require that the MBTA be given at least thirty (30) days' advance written notice in the event of any cancellation or non-renewal in coverage. All required policies of insurance shall not contain any exclusions for acts of terrorism, and shall fully cover any acts of terrorism. All such insurance as is required of Licensee shall be provided by or on behalf of all contractors, subcontractors and consultants to cover their operations performed. At the inception date of this License for Entry and throughout the term of this License for Entry, the MBTA shall be provided with certificates of insurance evidencing that such insurance policies are in place and provide coverage as required. Licensee shall be held responsible for any modifications, deviations, or omissions in the compliance with these requirements by any contractor, subcontractor or consultant of Licensee.

ALL CERTIFICATES OF INSURANCE PERTAINING TO THIS REQUEST (AS WELL AS RENEWAL CERTIFICATES) SHOULD DESCRIBE THE SITE THAT IS COVERED.

4.4 Compliance with Laws

Licensee shall comply with, and shall cause all work performed to comply with all federal, state, county, municipal and other governmental statutes, laws, rules, orders, regulations and ordinances.

Licensee shall also be responsible for obtaining any and all federal, state, and/or local permits and/or approvals necessary to carry out the activities permitted hereunder.

4.5 Non-Exclusive Use

The MBTA makes no representations or warranty, express or implied, that Licensee shall have sole or exclusive use of the Premises under this License for Entry. In the event other agreements, licenses, or easements have been or are granted, Licensee shall be responsible for coordinating its work and activities with that of other licensees and parties in interest. The MBTA shall not be liable for delays, obstructions, or like occurrences affecting Licensee, arising out of the work of the MBTA or other licensees or parties in interest.

Licensee's rights herein are granted subject to easements and rights of record and existing leases and licenses.

4.6 No Warranty

Licensee accepts the Premises "As Is" and the MBTA makes no warranty, express or implied, as to the condition of the Premises.

4.7 Termination

At the termination of this License for Entry, Licensee agrees to restore the Premises promptly to the condition it was in at the commencement of the term hereof, and to remove all of Licensee's personal property and debris from the Premises. Should Licensee not perform such restoration at the end of the Term, the MBTA may perform any and all necessary restoration at the sole expense of Licensee. Any personal property not so removed shall, at the option of the MBTA, either become the property of the MBTA or be removed by the MBTA and disposed of without any liability in the MBTA for such removal and disposition, all at the sole expense of Licensee.

4.8 Assignment

Licensee shall not, without the prior written consent of the MBTA, transfer or assign this License for Entry or any part hereof. Such consent may be withheld in the sole discretion of the MBTA. Any assignment made by Licensee without the prior written consent of the MBTA shall be rendered null, void, and of no further force or effect.

5. Notices

All notices, demands, requests, consents, approvals and other instruments required or permitted to be given pursuant to the terms hereof (hereinafter "Notice"), shall be in writing and shall be deemed to have been properly given when deposited in registered or certified United States mail, postage prepaid, return receipt requested, addressed, as described in Section 2.7 or when delivered by messenger or overnight mail service to the correct addressee. Notice shall be deemed received when actually received or when the proffered Notice has been refused by the addressee. The signature of an employee, servant or agent of the addressee shall be determinative on the issue of actual receipt.

Licensee and the MBTA shall, at any time and from time to time, have the right to specify as their proper addresses for purposes of this License for Entry any other address or addresses giving fifteen (15) days' written notice thereof to the other party.

6. Results

If this License for Entry explicitly allows Licensee to conduct certain investigations on MBTA owned land, then if asked to do so by the MBTA in writing, Licensee agrees to provide to the MBTA, at no cost, a copy of the results of such investigations (including data and analysis) and all other work conducted under this License for Entry in both hard copy form and in a digital format specified by the MBTA regardless of whether the report was prepared by Licensee, its agent, consultant or contractor, or prepared on behalf of Licensee. All results and reports shall be provided to the MBTA within ten (10) days of Licensee's receipt of the written request of the MBTA. Licensee agrees to consult with the MBTA prior to contacting any governmental entity, regarding any information, results of analysis or reports regarding the Premises. Licensee shall give the MBTA a copy of any reports or notifications, including but not limited to release notifications, prior to submitting the same to any governmental entity.

7. Default and Termination

(a) Termination for Non-Payment:

In the event that Licensee shall neglect or fail to pay any sum herein specified to be paid upon the due date hereunder, Licensee shall be in default and the MBTA shall have the right at any time thereafter to terminate this License for Entry by giving Licensee two (2) weeks written notice of the MBTA's decision to terminate for non-payment ("Termination Notice"). Licensee shall not be entitled to cure any such default by tendering payment after the expiration of the two (2) week grace period which starts upon Licensee's, or Licensee's servants, agents or employee's receipt of (or refusal to accept) the MBTA's Termination Notice. Any amount due hereunder that is not paid when due shall be charged to 1.5% per month and 18% per annum.

(b) Default of Terms and Conditions:

Licensee shall also be in default if Licensee:

- (1) fails to perform or observe any of the other covenants or agreements contained in this instrument and on its part to be performed or observed, or
- (2) makes any assignment for the benefit of creditors or files petition for relief under bankruptcy law, or
- (3) has a bankruptcy petition filed against it that is not dismissed within sixty (60) days, or
- (4) has its estate taken by process of law, proceeding in bankruptcy or insolvency or otherwise,

and if such defaults continue after two (2) weeks' written notice given by the MBTA to Licensee to cure, the MBTA may terminate this License for Entry by written notice to Licensee and/or deny access to the Premises and expel Licensee and those claiming through or under Licensee and remove Licensee's effects from the Premises without prejudice to any remedies which might otherwise be available for such breach of covenant, and, upon entry as aforesaid, the rights of Licensee created by this License for Entry shall terminate. Notwithstanding the preceding, if Licensee begins to cure a default as soon as possible within said two (2) week period and thereafter continues to pursue a cure with all due diligence, then the MBTA shall not terminate this License for Entry until and unless Licensee ceases to pursue a cure with all due diligence and has not in fact cured said default. Licensee agrees to pay any expense including reasonable attorneys' fees incurred by the MBTA in enforcing any of Licensee's obligations hereunder.

Notwithstanding the preceding, if the default is one that threatens the safety of the public or the ability of the MBTA or a Railroad Company to operate its transportation system, then it shall be considered an emergency default ("Emergency Default") and if Licensee does not affect an immediate cure, the MBTA may terminate the License for Entry upon reasonable notice and use self-help at the expense of Licensee and Licensee shall be responsible for such expenses as well as for a twenty-five percent (25%) administrative fee above the expenses.

In the event this License for Entry is terminated pursuant to this Section 7, the MBTA shall retain the License Fee as partial damages, without prejudice to its right to claim additional damages as a result of the breach.

8. Holding Over

If Licensee desires to continue the work defined in the Scope of Activity after the expiration or termination of this License for Entry, the resulting license shall be on a month-to-month basis and may be terminated by either party at any time by providing the other party with thirty (30) days prior written notice of termination. During the holding-over period, a monthly fee equal to three (3) times the equivalent monthly License Fee (calculated based on the length of the original term and the original License Fee established hereunder) shall be paid monthly in advance by Licensee to the MBTA. During such holding-over period, Licensee shall be bound by all applicable provisions of this License for Entry.

9. Work in Harmony

Licensee agrees that in any work performed in or about the Premises, it will employ only labor which can work in harmony with all elements of labor being employed by the MBTA or the Railroad Companies.

10. Promotional Material

Licensee shall not, without the prior written approval of the MBTA, refer to the MBTA in any promotional matter or material, including, but not limited to advertising, letterheads, bills, invoices and brochures.

11. Nondiscrimination

With respect to its exercise of all rights and privileges herein granted, Licensee shall undertake affirmative action as required by Federal and state laws, rules and regulations pertinent to Civil Rights and Equal Opportunity unless otherwise exempted therefrom. Licensee agrees that it shall comply with any and all required affirmative action plans submitted pursuant to the directives of any Federal agency and in accordance with applicable federal law and applicable state laws, rules and regulations.

Licensee shall not discriminate against any person, employee or applicant for employment because of race, color, creed, national origin, age, sex, sexual orientation, disability or military veteran status in its activities at the Premises, including without limitation, the hiring and discharging of employees, the provision or use of services and the selection of suppliers, contractors, or subcontractors.

Consistent with the law, Licensee shall use reasonable efforts to contact, encourage and utilize minority and female business enterprises in the procurement of materials and service under this License for Entry.

12. Taxes

Licensee shall be solely responsible for the payment of any taxes, levies, betterments or assessments, fees or charges, whether in existence on the date hereof or becoming applicable during the Term, which may be assessed against Licensee or the MBTA which are directly attributable to Licensee's installations in, or use of, the Premises, or any personal property or fixtures of Licensee located thereon (collectively referred to as "Taxes"). Licensee shall pay all Taxes directly to the taxing authority before delinquency and before any fine, interest, or penalty shall become due or be imposed by operation of law for their nonpayment. Such payments shall constitute an additional License Fee hereunder.

Licensee may contest, in good faith for its own account and at its own expense, the validity or amount of any Taxes, provided Licensee shall indemnify the MBTA against any resulting loss, cost and expense. Licensee shall not permit a lien or encumbrance on the Premises by reason of failure to pay any Taxes.

13. No Third-Party Beneficiaries

This License for Entry shall not be construed to create any third-party beneficiary rights in favor of any other parties (except the explicit rights granted to the Railroad Companies) or any right or privilege for the benefit of any other parties.

14. Entire Agreement

This License for Entry contains the entire agreement of the parties hereto with respect to the subject matter hereof, and no representations, inducements, promises, or agreements, oral or otherwise, between the parties hereto with respect to the subject matter hereof not embodied herein shall be of any force or effect.

15. Governing Law

This License for Entry shall be construed and interpreted under and pursuant to the laws of the Commonwealth of Massachusetts, and the Massachusetts and Federal conflict of laws provisions shall not be applied if the result is that other than Massachusetts law shall govern.

16. Successors and Assigns

The provisions of this License for Entry shall be binding on and inure to the benefit of the parties hereto and their respective successors and assigns.

17. Limitation on Damages

The MBTA shall not be liable to Licensee for any loss of business or any indirect, incidental, special, consequential or exemplary damages or lost profits unless specified herein.

18. No Waiver

No failure by the MBTA to insist upon strict performance of any term, covenant or condition hereof, or to exercise any right or remedy consequent upon a breach thereof shall constitute a waiver of any such breach or of any such term, covenant or condition. The acceptance by the MBTA of any amount less than the full amount due to the MBTA hereunder shall not be deemed a waiver by the MBTA of its right to collect the full amount due. The MBTA may deposit checks or drafts that state "final payment", "payment in full" or the like without being deemed to have waived its right to receive all amounts due hereunder. Any waiver by the MBTA of any term, covenant or condition hereof shall not be effective unless such waiver is in writing.

[Signature Page Follows]

IN WITNESS WHEREOF, the parties hereto have caused this License for Entry to be executed as of the Effective Date.

**MASSACHUSETTS BAY TRANSPORTATION
AUTHORITY, AS LICENSOR**

By: _____
Richard Henderson
Chief Real Estate Officer

[COMPANY.NAME], AS LICENSEE

By: _____
Name: _____
Title: _____
(Duly Authorized Representative)

DRAFT

EXHIBIT A

PLAN OF PREMISES

DRAFT

EXHIBIT B

SCOPE OF ACTIVITY

Subject to the terms and conditions in this License for Entry Agreement, Licensee, its agents, employees, contractors, subcontractors, and/or representatives are hereby granted a license to enter upon the Premises for the sole purpose as described in Section 2.6.

Licensee shall conduct all activities within the Premises in a safe manner and immediately notify the MBTA and the applicable Railroad Companies if any problem occurs which may result in a safety hazard. If any unsafe situation should occur, Licensee will correct the situation by eliminating any safety hazard immediately or, if the situation cannot be reasonably cured immediately, then in such longer time as is reasonably required, and in all such unsafe situations, the MBTA Railroad Operations Safety Procedures shall be followed.

Licensee shall submit a plan and detailed specifications (including the materials to be used) and the proposed methods of performing the work, or any part thereof (the "Plan") to the MBTA, ~~Choose an item.~~ and other applicable Railroad Companies. Licensee shall not enter the Premises until the Plan has been approved by the MBTA and the applicable Railroad Company or Railroad Companies. Such approval may be withheld in the MBTA's, or the applicable Railroad Company's sole discretion. The Scope of Activity for said construction, installation, maintenance, operation and/or replacement will be more fully defined in the approved Plan, which approved Plan will automatically be incorporated herein by reference and made part of this License for Entry. Licensee shall also provide the MBTA with a detailed schedule of times when Licensee, its employees, contractors, subcontractors, or agents would like to be on the Premises to undertake the Scope of Activity (the "Access Plan"). The MBTA and the applicable Railroad Companies shall have full power to make a final determination of when Licensee may be on the Premises as it is necessary to coordinate the work of all those desiring or having the right to access the Premises.

Unless entry is made pursuant to an Access Plan approved by both the MBTA and the applicable Railroad Companies, Licensee agrees to give, each time it desires entry, at least ten (10) days' prior written notification to the MBTA and the applicable Railroad Companies (except in cases of emergency when notice shall be given to the MBTA and the applicable Railroad Companies as quickly as possible) of its need to access the Premises for all work to be performed under this License for Entry. Licensee understands that the more notice given to the MBTA and the applicable Railroad Companies, the more likely it will be that Licensee can gain access at the times requested. The Licensee shall present evidence of the required insurance coverage before each entry. In the case of an emergency, Licensee shall as soon as possible contact the MBTA Control Center 617-222-5278.

No activities permitted herein may be performed by Licensee except as approved in writing by the MBTA; and no method of testing, installation or construction shall be used by Licensee except with prior written approvals or written approvals received in the field from the MBTA's representatives at the time the work is performed.

If at any time during the work of installation or connection, either the MBTA or the applicable Railroad Company should, in its sole and absolute discretion, deem flaggers, watchpersons, communications/signaling personnel, electric traction personnel, inspectors assigned to construction crews, and/or other measures, including but not limited to train re-routing, desirable or necessary to protect its operations, its property or its employees or other persons on or near the Premises, the MBTA and/or a Railroad Company shall upon notice to Licensee (where such notice is feasible) have the right to place such personnel, including personnel of the MBTA's or the Railroad Company's agents or to take such measures, at the sole cost and expense of Licensee. Such cost and expense shall include the current

wages and fringe benefits due and owing to such personnel in and for the performance of such measures. Licensee hereby covenants and agrees to bear the full cost and expense thereof and to reimburse the MBTA and/or the Railroad Company within thirty (30) days of receiving an itemized, written invoice for such reimbursement. The MBTA's or a Railroad Company's failure to furnish such personnel or take such measures shall not relieve Licensee of any obligation or liability it might otherwise have assumed, and shall not give rise to any liability to Licensee on the part of the MBTA or the Railroad Companies. Upon being notified that the personnel or measures referred to in the first sentence of this paragraph have been deemed desirable or necessary by the MBTA and/or a Railroad Company, Licensee shall not commence or continue construction or repair measures, as the case may be, unless and until such personnel or measures are in place.

If Licensee shall deem any requirement for flagging or the like by the MBTA, a Railroad Company, or one of their agents for supervision of the activity hereunder as unreasonable, Licensee shall nevertheless pay for such flagging and the like, but may take exception in writing thereto as an unreasonable requirement in each instance. The parties agree to review such exceptions at the times of billings for such services and attempt to adjust them as the MBTA may deem appropriate. This reimbursement is in addition to the License Fee and Administrative Fee required hereunder.

Licensee shall comply with all applicable MBTA Railroad Operations Directorate requirements including, but not limited to, those entitled: "I - Guidelines and Procedures for Construction on MBTA Railroad and Transit Properties", "II - Maintenance and Protection of Railroad Traffic", "III - Insurance Specifications" dated August 2014 and MBTA Special Instructions dated April 2003. To the extent that there is an irreconcilable conflict between the aforementioned requirements and this License for Entry, the terms and conditions contained in the MBTA Railroad Operations Directorate Procedures shall control, unless the requirements in this License for Entry are more strict.

No individual, including representatives and employees of Licensee, may enter onto the Premises unless that individual has first attended Choose an item.'s Roadway Worker Protection ("RWP") class.

EXHIBIT C

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EXHIBIT D

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EXHIBIT E

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EXHIBIT F

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MBTA Engineering Coordination and Construction Guidelines

As of August 12, 2022

General Requirements

- MBTA Engineering will provide information regarding coordination with Railroad Operations, Keolis, and Safety.
- The Applicant will be required to coordinate with these departments concerning notifications, scheduling, safety protocols, RWP training, and flagging services, for which a Keolis PI Agreement shall be established prior to the commencement of work.
- The Applicant shall bear all costs for MBTA personnel associated with the support of this project and may be required to enter into a Force Account Agreement to cover costs incurred by the MBTA, including MBTA Engineering Staff and oversight by MBTA Capital Programs Support Field Staff.
- The Applicant must comply with the current MBTA Railroad Operations Directorate – Guidelines and Procedures for Construction on MBTA Railroad Property, Section IV, Pipeline Occupancy Specifications.

Monitoring and Hazard Analysis

- A track vibration and alignment monitoring plan must be submitted to Railroad Operations for review and acceptance. The Applicant shall monitor for any track movement during the jack and bore operation.
- The MBTA shall not be responsible for any hazardous materials encountered as a result of this work.
- A Worksite Hazard Analysis (WSHA) must be conducted on site by Keolis, AMTRAK, or MBTA Construction Logistics, as applicable, to determine the level of protection required before work begins.

Applicant Responsibilities

- Agree to the terms and conditions governing access to the MBTA right-of-way and ensure there will be no interruptions to train movements.
- Incorporate all MBTA comments to the Work Plan and submittals into revised documentation or otherwise resolve them in writing to the satisfaction of MBTA.
- Coordinate all work with the MBTA Operations Control Center (OCC) and the Plans and Scheduling Department to ensure proper scheduling and flagging. Certain work may need to be performed during non-revenue hours.
- Notify this office of any proposed changes to the accepted Work Plan and submittals for review and acceptance before performing the work.
- Notify DigSafe (811) prior to the commencement of work activities.
- Protect existing MBTA infrastructure, including underground utilities, during all work.
- Acknowledge that MBTA reserves the right to stop work at any time if the work poses an unacceptable risk to MBTA customers, employees, operations, or infrastructure.

Site Restrictions

- No crane, manlift, or equipment swings shall be made within 30 feet of the nearest live track or 25 feet of the nearest catenary structure without MBTA authorization, appropriate flag protection (Keolis, AMTRAK, or MBTA), and a Capital Programs Support Field Staff person present.
- No materials or equipment may be stored within 15 feet of the nearest live track unless an accepted Work Plan documents the location and securement of the materials.
- No work shall occur on or abutting MBTA property without an accepted Work Plan.

Submittal Requirements

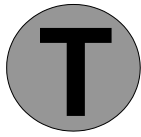
- Plans must show all property lines, structures, and the MBTA Zone of Influence (ZOI) and be stamped and signed by a Massachusetts-licensed professional engineer, architect, or land surveyor.
- A Job Hazard Assessment (JHA) must be submitted prior to work. It should identify potential hazards posed by the project site's proximity to the ZOI and be signed daily by all site workers.
- A Work Plan, Schedule, and Site Safety Plan must be submitted to the TOD Group at least five weeks before the start of work. These documents must identify means of protecting trains, tracks, AMTRAK catenary, and transit line third rail and catenary systems, as applicable.

Repairs and Responsibilities

- The Applicant shall perform, at their own cost and to the MBTA's satisfaction, any repairs to MBTA infrastructure necessitated by the Applicant's activities.
- The Applicant will be responsible for any replacement transportation costs associated with any disruption to MBTA service caused by project activity.
- The ZOI must be physically demarcated at the project site before work begins (unless within the right-of-way) and may only be removed after all licensed work is completed.

Additional Construction and Safety Requirements

- All material and equipment used during construction activities shall be easily movable to ensure worker safety and to prevent interference with MBTA operations, including during non-revenue hours.
- All personnel working on MBTA property or in areas with the potential to foul the Commuter Rail Right of Way (ROW) must complete Keolis Roadway Worker Protection (RWP) training prior to beginning work. Valid Keolis RWP ID cards must be carried at all times while working on or near the ROW.
- All necessary precautions must be taken to ensure the MBTA ROW is not fouled at any time.
- All work must be coordinated with MBTA Railroad Operations to ensure appropriate scheduling and flagging. Some work may be required during non-revenue hours based on operational needs.
- Any plans for future development not included in the current proposal must be submitted to MBTA Safety and all relevant departments for approval.
- The Applicant must coordinate with MBTA Capital Delivery to confirm that the proposed scope of work does not conflict with other nearby MBTA projects.
- The Applicant must notify DigSafe (811) prior to initiating any work activities.
- Appropriate precautions must be taken to prevent tools or materials from being dropped onto the MBTA ROW.
- Continued and unrestricted access for pedestrians and MBTA employees must be maintained throughout the duration of the work.
- Existing MBTA infrastructure, including underground utilities, must be protected at all times during construction.
- If, at any point, the MBTA determines that the Applicant's activities pose an unsafe condition for operations, infrastructure, customers, employees, or the public, the Applicant must immediately cease all work until the condition is remedied and approved by MBTA personnel.
- Proper Personal Protective Equipment (PPE) must be worn by all personnel on MBTA property at all times.



**MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY**

RAILROAD OPERATIONS DIRECTORATE

The attached Specifications are required for any construction and/or related activities on, over, under, within or adjacent to railroad property owned or controlled by the Massachusetts Bay Transportation Authority. They are intended to provide general guidelines and safeguards. Attachment "A" of Construction Guidelines and Procedures contains a summary of MBTA Railroad Operations Specifications which may be required. It is the responsibility of the Contractor to obtain all the necessary specifications for each project.

AUGUST 2014



**MASSACHUSETTS BAY
TRANSPORTATION
AUTHORITY**

RAILROAD OPERATIONS DIRECTORATE

I

GUIDELINES AND PROCEDURES
FOR CONSTRUCTION ON
MBTA RAILROAD PROPERTY

AUGUST 2014

SECTION 1. SCOPE

- 1.01 These specifications provide general safeguards to railroad property owned or controlled by the Massachusetts Bay Transportation Authority and to railroad operations upon that property during the performance of construction and/or related activities on, over, under, within or adjacent to the railroad property. They are intended as guidelines and do not represent all legal requirements which are or may be associated with construction and/or related activities. The MBTA reserves the right to require additional information and clarification and to make unilateral changes to these specifications at any time, at its sole discretion.

SECTION 2. DEFINITIONS

MBTA

Massachusetts Bay Transportation Authority; Massachusetts Realty Group, Designated Representative of MBTA Real Estate

RAILROAD COMPANY

The particular reference for the purpose of these specifications is the railroad company which maintains and/or operates or has trackage rights on the subject MBTA Railroad Property, including, but not limited to:

- Massachusetts Bay Transportation Authority (MBTA")
- Keolis Commuter Services
- Providence and Worcester Railroad (PW)
- National Railroad Passenger Corporation ("Amtrak")
- CSX Transportation ("CSX")
- Pan Am Railways (PAR) and subsidiaries The Boston and Maine Corporation (BM), The Springfield Terminal Railway Company (ST), its affiliates, successors and assigns
- Bay Colony Railroad Corporation (BLCR)

MBTA RAILROAD PROPERTY

All railroad rights of way and adjacent owned and/or controlled by the MBTA.

OWNER

The individual, utility, government, or corporation having title to the structure to be constructed upon, over or adjacent to the railroad property owned or controlled by the MBTA.

UTILITY

Public or private communication, water, sewer, electric, gas and petroleum companies or other entity governed by the Massachusetts Department of Public Utilities.

GOVERNMENT

Federal, State, Town, City, County and other forms of government.

CORPORATION

Any firm duly incorporated under laws of a state government.

INDIVIDUAL

Any party not defined by "Owner, Utility, Government or Corporation".

CONTRACTOR

The individual, partnership, firm, corporation or any combination thereof, or joint venture, contracting with a Utility, Government, Firm, Company, Corporation or Individual for work to be done on, over, under, within or adjacent to MBTA Railroad Property.

OWNER OR ITS CONTRACTOR

As used in these specifications, does not affect the responsibilities of either party for work conducted on, over, under, within or adjacent to MBTA Railroad Property.

CONSTRUCTION DRAWINGS

Original drawings, submitted to the Engineer by the Contractor pursuant to the Work, including, but not limited to: stress sheets, working drawings, diagrams, illustrations, schedules, performance charts, brochures, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, or other supplementary plans or similar data which are prepared by the Contractor or a Subcontractor, manufacturer, supplier or distributor, and which the Contractor is required to submit for review and approval by the MBTA. Working Drawings: Contractor prepared plans for temporary

structures and facilities. Working Drawings for elements of work which may affect safety of persons or property included but are not limited to Contractor's plans for temporary structures such as decking, temporary bulkheads, support of utilities, and for such other work as may be required for construction but which do not become an integral part of completed project.

SECTION 3. SUBMITTALS

3.01 INITIAL CONTACT

- A. The MBTA owns the majority of the railroad lines in eastern Massachusetts. Many of these railroad lines are operated for passenger service, using a Railroad Company as an operating and maintaining Contractor. Some of the railroad lines are used for freight-only service, operated and maintained by other Railroad Company(s). In most instances, both passenger and freight service are operated over the same railroad lines.
- B. All of the MBTA railroad lines are maintained by a designated Railroad Company(s), excepting rapid transit and light rail lines. The maintaining Railroad Company(s) has rights and responsibilities, in addition to the MBTA's property owner's rights.
- C. To obtain further information concerning License Agreements, Easements, Licenses for Entry and performance of construction related activities which affect MBTA Railroad Property, a written request may be forwarded to:

License Administrator
Massachusetts Realty Group
20 Park Plaza, Suite 1120
Boston, MA 02116

or you may access the website at www.mbtarealty.com

The License Administrator is also the contact person for information concerning rapid transit and light rail lines.

SECTION 4. PLANS AND SPECIFICATIONS

- 4.01 SCOPE: It is the intent of the MBTA to eliminate or minimize any risk involved with construction or related activities on, over, under, within or adjacent to MBTA Railroad Property. Therefore, MBTA approval and

frequently one or more Railroad Company(s) approval of construction plans and specifications for all phases of a proposed project affecting MBTA Railroad Property is required.

- 4.02 GENERAL: If requested by the License Administrator, the applicant must provide six (6) sets of plans and specifications to the License Administrator. These plans and specifications must meet the approval of the Railroad Company(s) and the MBTA prior to the start of construction. These plans are to be prepared in sizes as small as possible (no smaller than 11" x 17") and are to be folded to an 8-1/2 inch by 11 inch size (folded dimensions) with a 1-1/2 inch margin on the left side and a 1 inch margin on the top.
- A. After folding, the title block and other identification of the plans shall be visible at the lower right corner, without the necessity of unfolding. Each plan shall bear an individually identifying number and an original date, together with subsequent revision dates, clearly identified on the plan.
 - B. All plans are to be individually folded or rolled and where more than one plan is involved, they shall be assembled into complete sets before submission to the MBTA.
- 4.03 PLANS: The plans are to show all the work which may affect MBTA Railroad Property, and contain a location map and plan view of the project, with appropriate cross sections and sufficient details. The proposed construction or related activities must be (orated with respect to top of rail (vertical) and center line of track (horizontal)). The plan must also include railroad stationing, property lines and subsurface soil conditions. The subsurface information is to be in the form of boring logs with the borings located on the plan view. The plans must be stamped by a Professional Engineer registered in the state of Massachusetts. (The purchase of railroad valuation plans may be arranged by contacting MBTA Engineering offices at (617) 222-6178).
- 4.04 SPECIFICATIONS: The specifications summarized on Attachment "A" attached hereto are the Standard Specifications of the MBTA Railroad Operations Department and apply to all types of construction work affecting MBTA Railroad Property.
- A. In addition to "Maintenance and Protection of Railroad Traffic" and "Insurance Specifications" which are required for all work on, over, under, within or adjacent to MBTA Railroad Property, certain other Specifications contained in Attachment "A" shall be incorporated into construction/engineering submittals when deemed necessary by the MBTA and/or Railroad Company(s). (The purchase

of additional specifications may be arranged by contacting MBTA offices at (617) 222-3448 or visiting Massachusetts Realty Group website at www.mbtarealty.com.

SECTION 5. SUBMISSION REVIEW

- 5.01 An initial submission of six (6) sets of plans and specifications for MBTA review must be forwarded to the License Administrator, along with a completed MBTA Application for Entry (Attachment "B"). The submission will be circulated for review and comment to MBTA departments which may be impacted by the proposed project. If approved by the MBTA, the Railroad Company(s) will review.
- 5.02 The applicant is advised that the MBTA's initial review process requires a minimum forty-five (45) day period, prior to the Railroad Company(s) involvement, and additional processing time may be required for specific documents (See Section 9).

SECTION 6. INSPECTIONS/PAYMENTS

- 6.01 The MBTA may inspect all projects affecting MBTA Railroad Property at least twice, at the applicant's sole expense. The actual number of MBTA inspections will depend on the size and complexity of the project.
- 6.02 The MBTA may utilize Railroad Company inspectors and flagmen for daily inspection and protection of rail traffic during the term of the construction period or related activities. The Owner or Contractor will be responsible for advance payment of all associated fees.
- 6.03 Advance payments to the MBTA for construction/engineering review of plans and specifications by MBTA staff must be submitted when initial contact is made with the License Administrator. Payments shall be in the form of check or money order, made payable to the Massachusetts Bay Transportation Authority.
- 6.04 Advance payments covering the services for Railroad Company(s) construction/engineering review of plans and specifications, or services of an inspector or flagman, will be paid directly to the Railroad Company(s). The MBTA will advise when such services are required, and the Railroad Company(s) will advise of the amount of the required advance payment.

SECTION 7. EXAMINATION OF PLANS OR PROPERTY

- 7.01 The Contractor/Applicant shall have no claim for any differences between MBTA valuation plans and the actual conditions encountered in the field.

SECTION 8. INSURANCE AND INDEMNIFICATION

- 8.01 Prior to entry upon MBTA Railroad Property, insurance will be provided to and approved by the MBTA and affected Railroad Company(s), as outlined in "Insurance Specifications."
- 8.02 Additionally, all MBTA Licenses and Letters of Authorization contain a clause for Indemnifying MBTA and the Railroad Company(s) from and against any and all liabilities, losses, damages, costs, expenses, causes of action, suits, claims, demands and/or judgments of any nature whatsoever that may be imposed upon or incurred by or asserted against the MBTA or the Railroad Company(s).

SECTION 9. LEGAL DOCUMENTS FOR TEMPORARY AND PERMANENT INSTALLATIONS

- 9.01 The nature of entry upon or installation within MBTA Railroad Property will determine the authorizing document to be issued. Listed below are brief descriptions of MBTA documents:
 - A. **License for Entry:** Authorizes short-term entry for purposes of survey, Inspection, test borings, access, etc. One time administrative/engineering/legal review and access fees.
 - B. **License Agreement:** Authorizes installations, subject to termination clause, if Applicant chooses not to pursue an Easement. One time administrative/engineering/legal review fee as well as annual rental fee.
 - C. **Easement:** Authorizes permanent installations in form suitable for recording at Registry Deeds. All easements are non-exclusive and subject to relocation at the Owner's expense, for Mass transportation purposes:
 - 1. Easements must receive MBTA Board of Directors approval, which involves considerable time. Once approved by the Board of Directors and upon payment in full to the MBTA, a License for Construction is issued. Upon final inspection and acceptance of the installation by the MBTA the Easement document is issued.
 - 2. Permanent Subsurface Easement widths are limited to a maximum three-foot distance on either side of the occupation.

3.
 - a) A one-time administrative/engineering/legal review fee, in addition to value of easement, as established by independent appraisal conducted at the Applicant's expense.
 - b) If easement size is minimal, as determined by the MBTA, a fixed fee, encompassing administrative/engineering/legal review fee.

D. **Letter of Authorization:** Authorizes installations and construction activities in association with Master License Agreements. One-time administrative/engineering/legal review as well as access and/or annual fees.

ATTACHMENT "A"

SUMMARY OF MBTA RAILROAD OPERATIONS SPECIFICATIONS

I. GUIDELINES AND PROCEDURES FOR CONSTRUCTION ON MBTA RAILROAD PROPERTY

This general specification outlines the immediate design requirements and methodology for progressing construction activities on MBTA Railroad Property.

II. MAINTENANCE AND PROTECTION OF RAILROAD TRAFFIC

This specification will be included in ALL work requirements on MBTA Railroad Property, and covers rules, requirements, and protective services or any construction-related activity on MBTA Railroad Property. Supplemental specifications are listed below.

III. INSURANCE SPECIFICATIONS

This specification details the required insurance coverages and limits of the MBTA and Railroad Company(s).

IV. PIPELINE OCCUPANCY SPECIFICATIONS

This specification details requirements for all pipeline borings/jacking's and open cuts on or adjacent to MBTA Railroad Property, as well as requirements for Drawing submittals.

V. SPECIFICATIONS FOR WIRE CONDUIT AND CABLE OCCUPATIONS

This specification details requirements for clearances and installations of parallel and overhead crossings on MBTA Railroad Property, as well as requirements for Drawing submittals.

VI. BRIDGE ERECTION DEMOLITION AND HOISTING OPERATIONS

This specification details plan preparation for demolition and/or hoisting and erection of structures on and over MBTA Railroad Property.

VII. TEMPORARY SHEETING AND SHORING

This specification details requirements for plan preparation and calculations necessary for sheeting and shoring for construction on or adjacent to MBTA Railroad Property.

VIII. BLASTING SPECIFICATIONS

This specification outlines submittals, details and requirements for blasting on or adjacent to MBTA Railroad Property.

IX. TEMPORARY PROTECTION SHIELDS FOR DEMOLITION AND CONSTRUCTION

This specification outlines criteria for plan preparation related to protection of MBTA Railroad Property when work takes place on overhead structures.

X. INDUSTRIAL SIDE TRACK SPECIFICATIONS

This specification outlines minimal requirements for materials and installation submission for private railroad side tracks up to MBTA property line and/or clearance point. Other provisions, site-specific, may be required, including signal protection maintenance and protection of railroad traffic.

XI. RIGHT OF WAY FENCING SPECIFICATIONS

This specification details the requirements for the materials, construction and installation of standard right of way fence.

XII. TEST BORING SPECIFICATIONS

This specification outlines procedures and requirements for the performance of test borings on MBTA Railroad Property.

XIII. FIBER OPTIC CABLE SPECIFICATIONS

This specification details requirements for design and installation of fiber optic cables on MBTA Railroad Property; and is modified by site-specific requirements, including the construction methodology, location and type of fiber optic cables and protection conduits.

XIV. RAILROAD OPERATIONS BOOK OF STANDARD PLANS, TRACK AND ROADWAY, MW-I SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF TRACK

Certain construction activities may require obtaining this comprehensive package if rail construction details and requirements are related to the track operation.

XV. COMMUTER RAIL DESIGN STANDARDS

ATTACHMENT "B"

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
APPLICATION FOR ENTRY UPON MBTA RAILROAD, TRANSIT,
OR OTHER PROPERTY**

Date_____

1. Name of Applicant: _____
2. Type of Entity (Partnership, Corporation, Proprietorship, Public Authority, etc.):

3. Mailing Address: _____
4. Contact info:_____
5. If incorporated, state of incorporation:_____
6. Proposed license term commencement date:_____
7. Agents for applicant for service of notice or process: _____

8. Administrative Fee: 1,000.00 paid with application
9. *If plan reviews by The MBTA Design and Construction are deemed necessary the following fee shall apply:*

Design and Construction Plan Review Fee: 1,600.00 Paid with Application Fee
10. Applicant shall submit Drawings in pdf form and one set of paper Drawings to License Administrator
11. If applicant is self-insured, please provide limits of self-insurance and attach copies of authorizing legislation or certification thereof: _____

12. If applicant is authorized by public authority to enter into such license agreement, please provide:

Motion, Resolution, or Ordinance No.: _____

Date of Adoption: _____

Adopted by: _____

13. Is the applicant seeking permission to perform environmental testing and/or assessment on Authority property?

- a) Is the proposed testing and/or assessment required by the Massachusetts Contingency Plan ("MCP")?

- b) What is the Release Tracking number and current status of the MCP work?

14. Name, title and email of applicant's officer authorized to sign agreement: _____

Project Description

1. Brief description of construction (including types of pipes and other attachments or ancillary facilities to be installed on MBTA Railroad Property): _____

2. Brief description of purpose of entry and/or installation: _____

Space Requirements
[*To Be Provided*]

Technical Information

1. Is this occupancy within the limits of a public road? _____
Attach copies of applicant's franchise to occupy such space.
2. If occupancy is under, over, though, or attached to undergrade or overhead bridge, who owns such bridge? _____

3. Type of occupancy (facility):
 - a) Exact Length of MBTA Railroad Property to be burdened by occupancy: _____

 - b) Width of excavation facility on MBTA Railroad Property:

 - c) Number of manholes: _____

A. Aerial or underground wire and cable:

(1) Telephone and other communication cables:

Number of cables: _____

Number of pairs/cable: _____

Are these composite coaxial cables? _____

(2) Power Cables:

Number of cables/size: _____

Number of volts per conductor: _____

Are these pipe-type cables consisting of one or more high voltage cables encased in steel pipe under inert oil pressure? _____

(3) Fiber optic cables:

Number of cables: _____

Number of distribution cables: _____

Number of transmission cables: _____

Number of strands in each cable: _____

Number of repeater stations on MBTA Railroad Property: _____

Systems (check one):

Transmission _____

Distribution _____

Sensor _____

(4) Number of spare or unoccupied ducts to be installed: _____

B. Pipes and Sewers

(1) Circular line carrying no pressure:

Number of pipes: _____

Number of inches of inside nominal diameter per pipe: _____

(2) Circular lines under pressure and carrying non-flammable, non-explosive, or non-combustible supporting materials, except coal and slurry:

Number of pipes: _____

Number of inches of inside nominal diameter per pipe: _____

(3) Circular lines under pressure and carrying flammable, explosive, or combustible supporting material:

Number of pipes: _____

Number of inches of inside nominal diameter per pipe: _____

(4) Non-circular pipe: _____

(5) Will a pipe tunnel be constructed? _____

(6) Will pipe be supported by MBTA structures, bridges, etc.? _____

Explain: _____

(7) Will pipe be attached to MBTA structures, bridges, etc.? _____

Explain: _____

C. Ancillary Facilities

Number of wooden poles to be installed on MBTA Railroad Property:

Other wooden supporting structures: _____

Steel supporting structures: _____

Explain: _____

Number of braces, stub poles: _____

Number of guy wires anchored on MBTA Railroad Property: _____

Number of span guy wires crossing MBTA Railroad Property: _____

D. Attachments

- (1) Attachment of aerial wires and cables to poles or other structures of MBTA used in wire line construction or support:

Number of wires attached to MBTA cross-arm: _____

Voltage of wire: _____

Number of wires attached to applicant's cross-arm or bracket: _____

Voltage of wire: _____

Number of cross-arms or brackets attached to MBTA poles: _____

- (2) Attachment of aerial wires and cables to building or structures other than those used in wire line construction or support:

Number of wires or cables attached to MBTA's building or structures:

- (3) Attachment of cable terminals to poles, buildings, or structures including highway bridges, railroad bridges over highways, or other bridges of MBTA:

Number of cable terminals, loading coils, transformers, or like devices attached:

Explain: _____

E. Guy wire crossings and overhanging cross-arms and power wires of pole lines outside MBTA right-of-way.

Number of guy wires crossing MBTA Railroad property but not anchored thereon: _____

Number of cross-arms overhanging MBTA Railroad Property from poles located outside thereof: _____

Number of cross-arms on any poles: _____

It is hereby understood and agreed that the undersigned applicant will bear any and all costs associated with MBTA's preliminary and final engineering review in connection with this application. Any charges in excess of the initial advance payment will be billed directly to the address indicated in Item #3 above.

Agent: _____

For: _____
Name of Applicant

By: _____
(Title)

(Date)

REVENUE ENFORCEMENT AND PROTECTION PROGRAM CERTIFICATION

Pursuant to M.G.L. Ch. 62C, Sec. 49A, I certify under penalties of perjury that I (my company), to my best knowledge and belief, have (has) filed all state tax returns and paid all state taxes required under law.

_____ Social Security Number or Federal Identification Number	_____ Signature of Individual or Corporate Name
	By: _____ Corporate Officer (If applicable)
	Date: _____

EMPLOYER'S CERTIFICATE OF COMPLIANCE WITH
MASSACHUSETTS EMPLOYMENT SECURITY LAW

Pursuant to G. L. C. 151A, Sec. 19A (b), I _____
on behalf of (Name of Employer) _____,
D.E.T. ID Number _____, certify under the penalties of perjury¹ that the
aforementioned employer has complied with all laws of the Commonwealth relating to contributions
and payments in lieu of contributions.

Signed under the penalties of perjury this _____ day of _____, 20__.

Name of Employer

Signature

Name (Printed)

Title (Printed)

¹ The employer may certify its compliance if it has entered into and is complying with a repayment agreement satisfactory to the Commissioner or there is a pending adjudicatory proceeding or court action contesting the amount due pursuant to G. L. C. 161A, Sec. 19A(c).

STATEMENT REGARDING BENEFICIAL INTEREST

In compliance with the provisions of Chapter 7, Sec. 40J of the General Laws, I hereby state, under the penalties of perjury, that the true names and addresses of all persons who have or will have a direct or indirect beneficial interest in the real property subject to this Application dated

_____, 20____,

between _____ as applicant/tenant, for premises in the building (on the site) know as _____, and located at _____
_____ are listed below.

Name and residence of all persons with beneficial interests:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Signed: _____

Title: _____

Date: _____

ATTACHMENT "C"

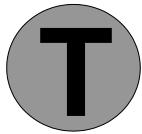
REFERENCED STANDARDS AND SPECIFICATIONS

- A. Wherever standards or specifications issued by a recognized industry association or regulatory body are referenced in these Specifications, the reference shall be interpreted as incorporating the referenced standard or specification in total into these Specifications as applicable. In the event of a difference between referenced standard or specifications and these Specifications, the latter shall govern.
- B. Technical Reference Abbreviations - References are made to recognized standards by use of the acronyms listed below. Addresses are included for convenience, and the accuracy of the addresses is not warranted:

AA	The Aluminum Association 900 19th Street NW Washington, DC 20006
AAR	The Association of American Railroads American Railroads Building 50 F Street NW Washington, DC 20001
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street NW Suite 249 Washington, DC 20001
ACGIH	American Conference of Governmental Industrial Hygienists 1330 Kemper Meadow Drive Cincinnati, OH 45240
ACI	American Concrete Institute P. O. Box 19150 Detroit, MI 48219
AFPA	American Forest and Paper Association 1111 19th Street, NW Suite 700 Washington, DC 20036

AIA	American Insurance Association 1130 Connecticut Avenue NW Washington, DC 20036
AISC	American Institute of Steel Construction Inc. 1 East Wacker Drive Suite 1300 Chicago, IL 60601
AIISI	American Iron and Steel Institute 1101 17th Street NW Suite 1300 Washington, DC 20036-4700
AITC	American Institute of Timber Construction 7012 South Revere Parkway Suite 140 Englewood, CO 80112
ANSI	American National Standards Institute 11 West 42nd Street New York, NY 10036
APA	American Plywood Association P. O. Box 11700 Tacoma, WA 98411
APHA	American Public Health Association 1015 15th Street NW Washington, DC 20005
AREA	American Railway Engineering Association 50 F Street NW Washington, DC 20001
ASCE	American Society of Civil Engineers 345 East 47th Street New York, NY 10017
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, NE Atlanta, GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017

ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPA	American Wood Preservers' Association P. O. Box 286 Woodstock, MD 21163-0286
AWS	American Welding Society 550 NW 42nd Avenue Miami, FL 33126
AWWA	American Water Works Association, Inc. 6666 W. Quincy Avenue Denver, CO 802350
CSI	Construction Specifications Institute 601 Madison Avenue Alexandria, VA 22314-1791
FHA	Federal Highway Administration 400 7th Street SW Washington, DC 20590
FRA	Federal Railroad Administration 403 7th Street SW Washington, DC 20590
ICBO	International Conference of Building Officials 5360 Workman Mill Road Whittier, CA 90601
IIA	Incinerator Institute of America 60 East 42nd Street New York, NY 10017



**MASSACHUSETTS BAY
TRANSPORTATION
AUTHORITY**

RAILROAD OPERATIONS DIRECTORATE

II

MAINTENANCE AND PROTECTION OF RAILROAD TRAFFIC

AUGUST 2014

SECTION 1. GENERAL

- 1.01 The Contractor should note that these specifications govern proposed work that involves construction on, over, under, within or adjacent to MBTA Railroad Property. Requirements must be strictly observed whenever the tracks, structures, or properties of the MBTA are involved or affected.
- 1.02 If the tracks or other facilities of the MBTA are endangered, the Contractor shall immediately perform such work as directed by the Railroad Company(s), and upon failure of the Contractor to carry out such orders immediately, the Railroad Company(s) may take whatever steps are necessary to restore safe conditions. The cost and expense to the Railroad Company(s) and/or MBTA of restoring safe conditions or of any damage to the MBTA's trains, tracks, or other facilities caused by the Contractors' or subcontractors' operations, shall be at the sole expense of the Contractor and will be collected as appropriate. This cost shall be paid for by the Contractor and may be deducted from any monies due and that may become due to the Contractor.
- 1.03 Before entering upon MBTA Railroad Property:
- A. The Owner or its Contractor shall be fully informed of all requirements of the MBTA pertaining to the specific project and shall conduct all their work accordingly. Any questions relating to the requirements of the MBTA should be directed to the Director of Engineering for MBTA Railroad Operations or their authorized representative.
 - B. The Owner or its Contractor shall execute an MBTA License for Entry, and shall provide the MBTA and Railroad Company(s) with the information required in the "Insurance Specifications".
 - C. The Owner or its Contractor shall take note that if an excavation is to be made within a 2 to 1 slope line commencing 5.5 feet from the centerline of track, they shall be required to submit the proposed method of soil stabilization for approval by the Director of Engineering for MBTA Railroad Operations.
 - D. The Owner or its Contractor shall furnish detailed plans for falsework, bracing, sheeting, or other supports adjacent to the tracks for approval by the Director of Engineering for MBTA Railroad Operations and the Railroad Company(s), and the work shall be performed in accordance with temporary "Sheeting and Shoring". All plans and calculations shall be stamped by a Registered Professional Engineer.
 - E. The Owner or its Contractor shall give written notice to the Director of Engineering for MBTA Railroad Operations and the applicable

Railroad Company(s) at least 21 days in advance of starting work or locating equipment at the site.

- F. The Owner or its Contractor shall make all necessary arrangements with the MBTA before entering upon MBTA Railroad Property.

1.04 After entering upon MBTA Railroad Property:

- A. The Owner or its Contractor shall have, in their possession on the job site, the contract plans and specifications which bear the stamp of approval of the Director of Engineering for MBTA Railroad Operations or Railroad Company(s). The Owner or its Contractor shall conduct all their work according to these plans and specifications.
- B. All work shall be performed and completed in a manner fully satisfactory to the MBTA Chief Engineering Officer or authorized representative(s). Railroad Company(s) inspection of the work shall be conducted at any time and the Owner or its Contractor shall cooperate fully with the MBTA and Railroad Company(s) representatives.
- C. All equipment used by the Owner or its Contractor on MBTA Railroad Property may be inspected by the Railroad Company(s) and shall not be used if considered unsatisfactory by the Railroad Company(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 would cause delay in the operation of trains or damage to MBTA or railroad facilities. Equipment shall not be placed or put into operation adjacent to a track without first obtaining the permission of the Railroad Company(s).
- D. Operators of such equipment must be properly licensed and may be examined by the Railroad Company(s) 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 MBTA Railroad Property.
- E. If the Director of Engineering for MBTA Railroad Operations 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., for use by Railroad Company(s) personnel providing services to the Owner's or Contractor's work.
- F. The Owner or its Contractor's work shall be performed in such manner that the tracks, train operations and appurtenances of the MBTA and the Railroad Company(s) will be safeguarded.

- G. Open excavations shall be suitably planked and safeguarded when construction operations are not in progress.
- H. Blasting will be permitted under or adjacent to tracks only after proof that blasting is required and all methods have been approved by the Director of Engineering for MBTA Railroad Operations and the Railroad Company(s). All blasting operations must comply with the MBTA's "Blasting Specifications".
- I. The Owner or its Contractor shall be fully responsible for all damages arising from their failure to comply with the requirements of these specifications. Failure to comply may result in their removal from MBTA Railroad Property, at the MBTA's sole discretion.

SECTION 2. RULES, REGULATIONS, AND REQUIRMENTS.

- 2.01 Railroad traffic shall be maintained at all times with safety and continuity, and the Contractor shall conduct all operations on, over, under, within or adjacent to MBTA Railroad Property within the rules, regulations, and requirements of the Railroad Company(s) and/or MBTA. The Contractor shall be responsible for acquainting themselves with such requirements as the Railroad Company(s) and/or MBTA may demand.
- 2.02 The Contractor shall obtain verification of the time and schedule of track occupancy from the Railroad Company(s) before proceeding with any construction or demolition work on, over, under, within or adjacent to MBTA Railroad Property. The work shall not proceed until the plans and method of procedure have been approved by the Director of Engineering for MBTA Railroad Operations or their authorized representative.
- 2.03 All work to be done on, over, under, within or adjacent to MBTA Railroad Property shall be performed by the Contractor in a manner satisfactory to the MBTA and the Railroad Company(s), and shall be performed at such times and in such manner, as to not interfere with the movement of trains or operations upon the tracks of the MBTA. The Contractor shall use all necessary care and precaution in order to avoid accidents, delays or interference with the MBTA's trains or other property.
- 2.04 The Contractor shall give written notice to the Railroad Company(s) at least twenty- one (21) days prior to the commencement of any work, or any portion of the work, by the Contractor or their subcontractors on, over, under, within or adjacent to MBTA Railroad Property, in order that necessary arrangements may be made by the Railroad Company(s) to protect railroad operations.

- 2.05 If deemed necessary by the Railroad Company(s), it may assign an inspector and/or engineer who will be placed on the work site during the time the Contractor or any subcontractor is performing work on, over, under, within or adjacent to MBTA Railroad Property. The cost and expense will be paid directly by the contracting party with an advance deposit to the Railroad Company(s), unless otherwise approved.
- 2.06 Before proceeding with any construction or demolition work, on, over, under, within or adjacent to the MBTA's Railroad Property, a pre-construction meeting shall be held at which time the Contractor shall submit for approval of the MBTA and Railroad Company(s), Drawings, computations, and a detailed description of the method for accomplishing the construction work, including methods of protecting railroad operations. Such approval shall not serve in any way to relieve the Contractor of complete responsibility for the adequacy and safety of the referenced methods.
- 2.07 During any demolition procedure, the Contractor must provide an approved shield to prohibit all debris from falling onto MBTA Railroad Property. A protective fence must be erected at both ends of the project to prohibit trespassers from entering MBTA Railroad Property.
- 2.08 Cranes, shovels, or any other equipment shall be considered to be fouling the track when located in such position that failure of same with or without load brings the equipment within the fouling limit. The Contractor's employees and equipment will not be permitted to work near overhead wires or apparatus.
- 2.09 The Contractor shall conduct their work and handle their equipment and materials so that no part of any equipment should foul an operated track or wire line without the written permission of the Railroad Company(s). When it becomes necessary for the Contractor to foul any track, they must give the Railroad Company(s) written notice of their intentions twenty-one (21) days in advance, so that if approved, arrangements may be made for proper protection of the Railroad Company(s).
- 2.10 The Contractor's equipment shall not be placed or put into operation adjacent to tracks without first obtaining permission from the Railroad Company(s). Under no circumstances shall any equipment or materials be placed or stored within fifteen (15) feet from the centerline of the closest track.
- 2.11 Materials and equipment belonging to the Contractor shall not be stored on MBTA Railroad Property without first having obtained permission from the Railroad Company(s), and such permission will be on the condition that the MBTA and/or Railroad Company(s) will not be liable for damage to such materials and equipment from any cause. The Contractor shall keep the

tracks adjacent to the site clear of all refuse and debris that may accumulate from construction operations, and shall leave the MBTA Railroad Property in the condition existing before construction commencement. Equipment repair, refueling or extended storage is prohibited on MBTA Railroad Property.

- 2.12 The Contractor shall consult the Railroad Company(s) in order to determine the type of protection required to insure safety and continuity of railroad operations. The railroad field engineer may assign track foremen, flagmen, signalmen or other employees deemed necessary for protective services by the Railroad Company(s), to insure the safety of trains and MBTA Railroad Property. The cost of same shall be paid directly by the contracting party with an advance deposit to the Railroad Company(s), unless otherwise approved.
- 2.13 The provision of such protective services, and other precautionary measures, shall not relieve the Contractor from liability for the cost of any and all damages caused by their operations.
- 2.14 The Railroad Company(s) will require protection during all periods when the Contractor is working on, over, under, within or adjacent to MBTA Railroad Property or as may be deemed necessary. When protection is required, the Contractor shall make the request in writing to the Railroad Company(s) at least twenty-one (21) days before such protection is required.
- 2.15 The Contractor shall not bill the Railroad Company(s) or MBTA for any work which they are proposing to perform, unless the Railroad Company(s) or MBTA authorizes the said work in writing. This work must be to the benefit of the MBTA or Railroad Company(s).
- 2.16 The Contractor, subcontractor and respective employees who will come within the limits of the MBTA Railroad Property, must first attend the Railroad Company(s) Safety Orientation Class. They are required to comply with the Railroad Company(s) Safety Requirements throughout the entire construction period. All costs associated with compliance of the Railroad Company(s) Safety Requirements will be at the sole expense of the Contractor and subcontractors.
 - A. The Contractor for the project must appoint a qualified person who will be designated as a Safety Representative. They must be approved by the Railroad Company(s) Safety Representative. The Contractor's designee will be responsible to give Safety Orientation to the Contractor's/subcontractor's employees who will come onto the MBTA's Railroad Property for short periods of time after the initial Safety Orientation Class has been given by the Railroad Company(s). The Contractor's designee will keep the Railroad Company(s) Safety Representative informed of the temporary employees who received Safety Orientation. The Railroad Company(s)

Safety Orientation Class will be repeated when employee turnover or groups of Contractor's and subcontractor's employees are such that another Railroad Company(s) Safety Orientation Class is justified.

- B. All Contractors shall follow established safety procedures and remain 15 feet or more from the closest rail of the closest track. When it becomes necessary for Contractors to encroach on this 15 foot limitation, the proper fouling procedures will be arranged with the Railroad Company(s).
 - C. Contractors will establish the 15 foot foul line by installing stakes and taping off the area prior to beginning work.
- 2.17 Upon completion of the work, the Contractor shall remove from the MBTA Railroad Property, all machinery, equipment, surplus materials, falsework, rubbish, temporary buildings and other property of the Contractor, or any subcontractor, and shall leave MBTA Railroad Property in a condition satisfactory to the MBTA and Railroad Company(s). Failure to comply will result in Railroad Company(s) forces restoring MBTA Railroad Property at the Contractor's expense.
- 2.18 The Contractor will pay the Railroad Company(s) directly, for all protective services unless otherwise approved. The services are performed to insure safe operation of trains when construction work would, in the Railroad Company(s) opinion, be a hazard.

SECTION 3. DEFINITION OF HAZARD

- 3.01 Protection Services will be required whenever the Contractor is performing work on, over, under, within or adjacent to MBTA Railroad Property. This will include excavating, sheeting, shoring, erection, removal of forms, handling material, using equipment which by swinging or by failure could foul the track, and when any other type of work being performed, in the opinion of the Railroad Company(s), requires such service.
- 3.02 Railroad operations will be considered subject to hazard when explosives are used in the vicinity of MBTA Railroad Property 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 closer than 5 feet to the center line of a track or wire line. None of these or similar operations, shall be carried on without Railroad Company(s) protective services personnel on site.
- 3.03 A signal line or communication line shall be considered fouled and subject to hazard when any object is brought closer than ten (10) feet to any wire or cable. An electrical supply line shall be considered fouled and subject to hazard when any object is brought closer than ten (10) feet to any

wire of the line.

- 3.04 As excavation approaches pipes, conduits, or other underground structures on or adjacent to MBTA Railroad Property, digging by machinery shall be discontinued and the excavation shall continue by means of hand tools. All existing pipes, poles, wires, fences, property line markers, and other structures, which the MBTA and/or Railroad Company(s) decides must be preserved in place, shall be carefully protected from damage by the Contractor or its Owner. Should such items be damaged, they shall be restored by the Railroad Company(s), at the Owner's or Contractor's sole expense to the original condition prior to construction commencement. If any excavation is taken beyond the work limit indicated on the approved Drawings or prescribed herein, the Owner or its Contractor shall backfill and compact to the satisfaction of the Railroad Company(s) at the Contractors expense.

SECTION 4. BACKFILL

4.01 Backfilling

- A. All backfill material adjacent to any Railroad Company(s) facility shall be approved by the Railroad Company(s). Backfill material shall be free from hard lumps and clods larger than 3 inches in diameter, and free from large rocks or stumps. Uniformly fine material shall be placed next to any pipe liable to dent or break.
- B. All backfill material shall be compacted at or 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. Material shall be compacted to not less than 95 percent of AASHTO T 99, Method C. The Contractor will be required to supply to the job site, ballast stone (AREA #4) to be installed by the Railroad Company(s).

4.02 Certification

The Owner or its Contractor shall provide testing, through the use of a testing lab or Professional Engineer, to insure that the in place density of the backfill meets or exceeds the requirements of Section 4.01(B). Written certification of the tests shall be given to the Railroad Company(s) immediately upon completion of the test.

4.03 Alternate

In the case of an open cut crossing of the MBTA Railroad Property, the Owner or its Contractor may backfill with concrete having a three-day compressive strength of 1000 psi to the base of the track subgrade. This

may be used in lieu of providing the certification of proper compaction when using gravel backfill. The Owner or its Contractor will be required to supply to the job site, ballast stone (AREA #4) to be installed by the Railroad Company(s).

SECTION 5. CLEARANCES

- 5.01 Staging falsework or forms shall at all times be maintained with a minimum vertical clearance of 226" above top of the high rail and a minimum horizontal clearance of 15' from the center line of track.

SECTION 6. PROTECTION SERVICES

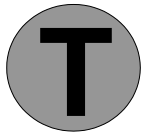
- 6.01 The MBTA shall require railroad inspection and may require railroad flagging. Prior to the start of any work on MBTA Railroad Property, the Owner or its Contractor shall submit a deposit to the amount required by the Railroad Company(s). If Railroad Company(s) expenses are greater than the amount of deposit, the Owner or its Contractor shall reimburse the Railroad Company(s) for the balance when billed, and, if the Railroad Company(s) expenses are less than the amount of deposit, the Railroad Company(s) will refund the balance to the Owner or its Contractor. The Railroad Company(s) reserves the right to request additional deposits as project work progresses.
- 6.02 If the MBTA or Railroad Company(s) determines that flagmen are necessary, the number required shall be on duty at the site during the hours of hazard described under Section 3. No work shall be performed if flagmen are required but are not on duty.
- 6.03 It shall be the responsibility of the Owner or its Contractor to keep the MBTA and Railroad Company(s) informed at all times when the Owner or its Contractor shall be working on, over, under, within or adjacent to MBTA Railroad Property and creating the hazards described under Section 3. Failure of the Owner or its Contractor to give the MBTA and Railroad Company(s) suitable advance notice of hazardous operation shall result in the shutdown of the work by the Railroad Company(s), until such time as sufficient numbers of flagmen are on duty at the site. If this becomes a repeat occurrence, the Contractor will be removed from the project.
- 6.04 The Railroad Company(s) will make its best effort to provide protective services personnel. Should the situation arise where such personnel are not available, Contractor operations must cease. The Railroad Company(s) is not liable for any monetary claims incurred during the absence of protective services personnel.

SECTION 7. INSPECTION

- 7.01 If deemed necessary by the Director of Engineering for MBTA Railroad Operations, the MBTA will furnish and assign an engineer(s) for inspection and the Railroad Company(s) will furnish an appropriate inspector for general inspection purposes or for general protection of MBTA Railroad Property and operations during construction. All protection services will be at the expense of the Owner or its Contractor.

SECTION 8. EXTRA-CONTRACT SERVICES

- 8.01 Temporary and permanent changes of tracks and all railroad utilities made necessary by the work of the Contractor, will be made by the MBTA or Railroad Company(s) at the expense of the Owner or its Contractor.
- 8.02 All other changes made or services furnished by the Railroad Company(s), at the request of the Owner or its Contractor, will be at the Owner's or its Contractor's expense.



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INSURANCE SPECIFICATIONS

The insurance outlined in these Specifications is required of the Owner or Contractor, and shall be provided by or in behalf of all subcontractors performing any portion of the work. The Owner or Contractor shall be responsible for any modifications, deviations or omissions of the required insurance as it applies to subcontractors.

All insurance policies, unless otherwise specified under Railroad Protective Liability Insurance, are to be written either on an occurrence basis or, if a claims-made form, applicable renewals must have a date retroactive to the construction start date and shall be maintained in force for one year following the acceptance of the work by the MBTA or its duly authorized representative.

With the exception of Railroad Protective Liability Insurance, all insurance policies must name the MBTA as an additional insured as its interest appears and waive any rights of subrogation against the MBTA.

Certificates of Insurance evidencing (1) either the claims-made or occurrence form coverage, (2) work description/location, (3) Owner or Contractor's corporate name, and (4) individual, company, government agency or municipality for which the work is being performed, are to be furnished to the MBTA prior to work commencement, and within fifteen (15) days of expiration of the insurance coverage, when applicable.

All policies must contain a minimum thirty (30) day written notice of cancellation clause, and provide that the Insurance Company shall notify the Owner, Contractor, MBTA and Railroad Company(s), via registered mail, of any cancellation, change or expiration of the policy.

Original Insurance Certificate(s) shall be received and approved by the MBTA before the Owner or Contractor will be allowed entry upon MBTA Railroad Property. Certificates, including any required endorsements, shall be furnished to the MBTA, c/o Risk Manager, Office of the Treasurer-Controller, Ten Park Plaza, Room 8450, Boston, MA 02116, and shall provide stated coverage and a provision that Notice of Accident (occurrence) and Notice of Claim shall be given to the Insurance Company as soon as practicable after notice to the insured(s).

Original Insurance Binders reflecting Railroad Protective Insurance shall be received and approved by the MBTA and the appropriate Railroad Company(s) prior to entry upon MBTA Railroad Property. Mailing addresses for transmittal of original Insurance Binders to the named insured Railroad Company(s) are contained on Page Four of these Specifications.

The Owner or Contractor shall indemnify, defend and save harmless the MBTA and the appropriate Railroad Company(s) from and against any and all liabilities, losses (including losses of revenue), claims, costs, damages and expenses (including reasonable attorney's fees and expenses) that may be asserted against or incurred by the MBTA and the Railroad Company(s) arising from or as a result of the Owner or Contractor's work, or its use of adjacent land. Said indemnification shall include claims, whether covered by insurance or not, including, but not limited to

Workers Compensation and similar insurance.

The Owner or Contractor shall maintain, during the life of the contract, from company (s) authorized to do business in the Commonwealth of Massachusetts and satisfactory to the MBTA:

A. COMMERCIAL GENERAL LIABILITY INSURANCE for personal injury, bodily injury and property damage in an amount not less than \$1,000,000 per occurrence and \$3,000,000 in the aggregate covering all work performed on over or adjacent to MBTA Railroad Property (the "work"), including:

1. All operations;
2. Contractual liability;
3. Coverage for the so-called "X, C, U" hazards, i.e., collapse of building, blasting, and damage to underground property;
4. Asbestos abatement, when applicable.

B. AUTOMOBILE LIABILITY INSURANCE including the use of all vehicles owned, non-owned, leased and hired, in an amount not less than \$1,000,000 combined single limit covering all the work.

C. WORKER'S COMPENSATION INSURANCE including Employees, Liability Insurance, as provided by Massachusetts General Laws, Chapter 152, as amended, covering all the work.

D. UMBRELLA LIABILITY COVERAGE in an amount not less than \$10,000,000 per occurrence covering all the work.

E. HAZARDOUS MATERIALS INSURANCE if the work involves hazardous materials, the following coverage is required:

1. **Pollution Liability insurance** for sudden and gradual occurrences in an amount not less than \$1,000,000 per occurrence and \$5,000,000 in the aggregate arising out of the work, including but not limited to all hazardous materials identified in the contract.
2. When applicable, the Owner or Contractor shall designate the disposal site and furnish a Certificate of Insurance from the Disposal Facility for Environmental Impairment Liability Insurance for (a) sudden and accidental occurrences in an amount not less than \$3,000,000 per occurrence and \$6,000,000 in the aggregate and (b) non-sudden occurrences in an amount not less than \$5,000,000 per occurrence and \$10,000,000 in the aggregate.

3. Certificates of insurance shall clearly state the hazardous materials exposure work being performed.

F. RAILROAD PROTECTIVE LIABILITY INSURANCE is specifically designed for insuring Railroads, and is purchased by the Owner or Contractor in the name of the MBTA and the Railroad Company(s). **The Railroad Company(s) is the named insured on the policy.** Railroad Protective Liability Insurance is required for any work performed within fifty (50) feet from center line of the nearest railroad track; it is not a substitute for any types of insurance outlined in these Specifications. Required limits are:

Bodily injury: not less than \$5,000,000 for all damages arising out of bodily injuries to or death of one person, and subject to that limit for each person, a total limit of \$6,000,000 for all damages arising out of bodily injury to or death of two or more persons in any one accident;

Property Damage: not less than \$10,000,000 or all damages arising out of injury to or destruction of MBTA property in any one accident, and subject to that limit per accident, a total of \$10,000,000 in the aggregate for all damages arising out of injury to or destruction of MBTA property.

Questions regarding insurance should be directed to MBTA's Risk Manager at (617) 222-3064.

Questions regarding train counts and train speeds should be directed to the appropriate Railroad Company(s) listed on Page Four.

PROOF OF INSURANCE

MAILING ADDRESSES:

MBTA

Risk Manager
c/o Treasurer-Controller
10 Park Plaza
Boston, MA 02116
cc: Massachusetts Realty Group

National Railroad Passenger Corporation (Amtrak)

Boston Division Office
c/o Division Engineer
2 South Station 5th Floor
Boston, MA 02110

CSX Transportation Inc.

500 Water St.
Jacksonville, FL 32202

Bay Colony Railroad Corporation

General Manager
4 Freight House Road
East Wareham, MA 02571

Boston and Maine Corporation
and Springfield Terminal Railway
Co.

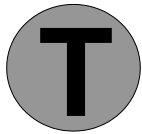
Chief Engineer
402 Amherst Street
Suite 300
Nashua, NH 03063-1287

Providence and Worcester
Railroad Company

P. O. Box 1188
Worcester, MA 01601

Keolis Commuter Services

Chief Engineering Officer
470 Atlantic Ave.
Boston, MA 02110



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IV

PIPELINE OCCUPANCY SPECIFICATIONS

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SECTION 1. GENERAL REQUIREMENTS

1.01 DESCRIPTION OF WORK AND LOCATION

These specifications apply to the design and construction of pipelines carrying flammable and non-flammable substances and to casings over 4-inches in diameter containing wires and cables, under, across or along MBTA Railroad Property, facilities and tracks.

1.02 LICENSE TO ENTER RAILROAD PROPERTY

- A. Entry upon MBTA Railroad Property for the purpose of conducting surveys, field inspections, obtaining soil information, or any other purpose associated with the design and engineering of the proposed occupancy, will be authorized by an MBTA License for Entry (See "Guidelines and Procedures for Construction on MBTA Railroad Property").
- B. Issuance of the License does not constitute authority to proceed with the actual construction.

1.03 WORK ON RAILROAD PROPERTY

- A. The safety and continuity of train operations shall be the first priority. The Applicant shall arrange the work so that the trains will be protected and safeguarded at all times. Whenever the work may affect the safety and movement of trains, the method, sequence and time schedule of performing such work shall be submitted to the Director of Engineering for MBTA Railroad Operations or their authorized representative for approval.
- B. The Applicant waives all claims against the Railroad Company(s) and/or the MBTA for delays or any interference occasioned by railroad traffic or railroad maintenance.
- C. All Applicant-designed temporary construction on MBTA Railroad Property shall be designed in accordance with the appropriate railroad criteria and all construction performed on, over, under, within or adjacent to MBTA Railroad Property will be subject to the inspection and approval of the Railroad Company(s) and/or MBTA.
- D. A minimum of fourteen (14) days advance written notice shall be given to the Railroad Company(s) prior to construction related activities.
- E. The Railroad Company(s) will furnish such qualified flagmen, signalmen or protection men as may be required to insure complete

protection of train operations and railroad facilities. The need for this type of service will be determined by the Railroad Company(s) on the basis of railroad regulations and the Applicant's approved construction schedule. No work shall proceed without proper protection on the site.

- F. All expenses incurred in connection with protection of railroad facilities by Railroad Company(s) employees will be borne by the Applicant. Billings for such service or expense, including labor, materials and equipment will be made directly to the Applicant for payment.
- G. During construction, railroad traffic shall be maintained at all times without interruption, except when approved in advance, in writing, by the Director of Engineering for MBTA Railroad Operations or their authorized representative.
- H. All construction operations shall be conducted so as not to interfere with, interrupt, or endanger the operation of trains, nor damage, destroy, or endanger the integrity of railroad facilities. All work on or near MBTA Railroad Property shall be conducted in accordance with the Railroad safety rules and regulations. The Applicant shall secure and comply with the Railroad safety rules and shall give written acknowledgment to the Railroad Company(s) that they have been received, read, and understood by the Applicant and their employees. Construction operations will be subject to Railroad Company(s) inspection at any and all times.
- I. All cranes, lifts, or other equipment that will be operated in the vicinity of the MBTA's electrification and power transmission facilities shall be electrically grounded as directed by the Railroad Company(s).
- J. At all times when the work is progressing, a field supervisor for the work with no less than twelve (12) months experience in the operation of the equipment being used shall be present. Certification of the above must be submitted to the Railroad Company(s).
- K. Whenever equipment or personnel are working closer than fifteen (15) feet to the closest rail of an adjacent track, that track shall be considered as being obstructed. As best possible, all construction operations shall be conducted no less than this distance. Construction operations closer than fifteen (15) feet to the closest rail of a track shall be conducted only with the permission of, and as directed by, a qualified Railroad Company(s) employee present at the work site.
- L. Crossing of tracks at grade by equipment and personnel is prohibited except by prior arrangement with, and as directed by, the Director of

Engineering for MBTA Railroad Operations or their authorized representative.

- M. All tunneling, jacking and boring operations within railroad influence lines will be done on a 24 hour per day basis to minimize Railroad exposure to construction hazards.

1.04 COORDINATION

The Applicant shall coordinate the work with their Contractors, subcontractors, utility companies, governmental units, and any affected Railroad Company(s) with regard to site access, establishment and use of temporary facilities, work schedules, and other elements of the specified work which require interfacing with others.

1.05 LAYOUT OF WORK

The Applicant shall lay out their work true to lines and grades indicated on the Drawings and shall be responsible for all measurements in connection therewith. The Applicant will be held responsible for the execution of the work to such lines and grades indicated on the approved construction Drawings or such other lines and grades as may be directed or established by the Director of Engineering for MBTA Railroad Operations or their authorized representative.

1.06 INDEMNIFICATION AND INSURANCE

See requirements in "Guidelines and Procedures for Construction on MBTA Railroad Property" and "Insurance Specifications."

1.07 SCIENTIFIC OR HISTORIC ARTIFACTS

The Applicant shall immediately notify the Director of Engineering for MBTA Railroad Operations of the discovery of scientific or historical artifacts and shall protect same until identified and removed by the appropriate Authorities exercising jurisdiction.

1.08 RECORD DOCUMENTS

- A. The Applicant shall furnish the Railroad Company(s) and the MBTA with one reproducible "As Built" copy of each approved Construction Drawing, marked to indicate all changes and deviations from same.
- B. All project record documents shall be received and accepted by the MBTA and the Railroad Company(s) prior to final inspection.

SECTION 2. SUBMITTALS

2.01 APPLICATION FOR OCCUPANCY

The Applicant must agree, upon approval of the construction details by the Director of Engineering for MBTA Railroad Operations, to execute the MBTA Pipeline Occupancy Agreement and pay any required fees and/or rentals outlined therein. Refer to "Guidelines and Procedures for Construction on MBTA Railroad Property" for application policy.

2.02 SUBMISSION OF CONSTRUCTION DRAWINGS AND SPECIFICATIONS

- A. Six (6) sets of Drawings and specifications for proposed pipeline occupations shall be submitted to the AGM for Real Estate and Asset Development and meet the approval of the Railroad Company(s) and the MBTA prior to the start of construction. These plans are to be prepared in sizes as small as possible and are to be folded to an 8-1/2 inch by 11-inch size (folded dimensions) with a 1-1/2 inch margin on the left side and a 1-inch margin on the top.
 - 1. After folding, the title block and other identification of the Drawings shall be visible at the lower right corner, without the necessity of unfolding. Each Drawing shall bear an individually identifying number and an original date, together with subsequent revision dates, clearly identified on the Drawing.
 - 2. All Drawings are to be individually folded or rolled and where more than one Drawing is involved, they shall be assembled into complete sets before submission to the MBTA.
- B. Drawings shall be to scale and show the following (see attached Plates).
 - 1. Plan view of proposed pipeline in relation to all railroad facilities.
 - 2. Location of pipe (in feet) from nearest railroad milepost, centerline of a railroad bridge (giving bridge number), or centerline of an existing or former passenger station, or other fixed point. In all cases, the name of the City or Town and County in which the proposed facilities are located must be shown.
 - 3. Profile of ground on centerline of pipe from field survey showing relationship of pipe and casing to ground level, tracks and other facilities. For longitudinal occupations, the profile of adjacent track(s) must be shown.

4. All MBTA property lines. If pipeline is in a public highway, the limits of the right-of-way for the highway shall be clearly indicated with dimensions from centerline.
 5. The angle of crossings in relation to centerline of tracks.
 6. Location of valves or control stations of the pipeline.
 7. "Pipe Crossing Data Sheet" completed and out on Plan.
- C. The Drawing must be specific (both on MBTA Railroad Property and under tracks that are not on MBTA Railroad Property) as to:
1. Method of installations.
 2. Size and material of casing pipe.
 3. Size and material of carrier pipe.

These items shall not have an alternative.

- D. Once an application is approved by the Director of Engineering for MBTA Railroad Operations or their authorized representative, proposed variances from the approved plans, specifications, method of construction, etc., will be resubmitted for approval.
- E. Location and dimensions of jacking, boring, or tunneling pits shall be shown with details of their sheeting and shoring. If the bottom of the pit excavation nearest the adjacent track intersects a line from a point 5.5 feet horizontally from center line of adjacent track at the plane of the base of fall drawn on a slope of 2 horizontal to 1 vertical, submit design and details of the pit construction to the MBTA for approval complete with computations prepared by a Registered Professional Engineer. In any event, the face of the pit shall be no less than 25 feet from adjacent track, unless otherwise approved by the Director of Engineering for MBTA Railroad Operations or their authorized representative. Pits shall be fenced, lighted, and otherwise protected as directed by the Railroad Company(s).
- F. All Drawings and computations, including those submitted by Contractors, must bear the seal of a Registered Professional Engineer.
- G. Computations for all structures involving the support or protection of railroad track, embankment and facilities must be prepared by and bear the seal of a Registered Professional Engineer and shall be submitted within the construction Drawings.
- H. When computer calculations are included with design calculations, the following documentation shall be furnished:

1. A synopsis of the computer program(s) stating briefly required input, method of solution, approximations used, second order analysis incorporated, specifications or codes used, cases considered, output generated, extent of previous usage of certification of program(s) and program(s) author.
 2. Identification by number, indexing and cross-referencing of all calculation sheets, including supplemental "long-hand" calculation sheets.
 3. Fully identified, dimensioned, and annotated diagram of each member or structure being considered.
 4. Clear identification and printing of all input and output values, including intermediate values if such values are necessary for orderly review.
 5. Identification of the processing unit, input/output devices, storage requirements, etc., if such supplemental information is significant and necessary for evaluation of the submittal.
- I. Specifications shall conform to Construction Specifications Institute (CSI) 16 Division, 3-part Section Format.
- J. If other than American Railway Engineering Association (AREA), American Society for Testing and Materials (ASTM), or American National Standards Institute (ANSI) specifications are referred to for design, materials or workmanship on the Construction Drawings and specifications for the work, then copies of the applicable sections of such other specifications referred to shall accompany the Construction Drawings and specifications for the work.

SECTION 3. TEMPORARY FACILITIES AND CONTROLS

3.01 REQUIREMENTS OF REGULATORY AGENCIES

Applicant shall:

- A. Obtain and pay all costs for required permits for installation and maintenance of temporary facilities and controls.
- B. Comply with all applicable Federal, State and local codes, regulations and ordinances.
- C. Comply with regulations and requirements of all utility or service companies from which temporary utilities or services are obtained, and pay all costs incurred therewith.

3.02 INSTALLATION AND COORDINATION - GENERAL

Applicant shall:

- A. Install all temporary facilities and controls in a neat and orderly manner.
- B. Make all temporary facilities structurally and functionally sound throughout.
- C. Construct temporary facilities and controls to give continuous service and to provide safe working conditions.
 - 1. Enforce conformance with applicable standards
 - 2. Enforce safe practices.
- D. Modify, extend or relocate temporary facilities and controls as work progress requires.
- E. Locate temporary facilities and controls to avoid interference with, or hazards to:
 - 1. Work or movement of railroad personnel or traffic.
 - 2. Vehicular traffic.
 - 3. General Public.
 - 4. Work of other contracts.
 - 5. Railroad Passengers.
- F. Obtain easements as may be required across non-MBTA Railroad Property.
- G. Provide materials for temporary facilities and controls for the purpose intended and shall not violate requirements of applicable codes and shall not create unsafe conditions.

3.03 SANITARY FACILITIES

Prior to the start of work, the Applicant shall furnish necessary toilet conveniences, secluded from public observation. They shall be kept in a clean and sanitary condition and comply with the requirements and regulations of the area in which the work is performed.

3.04 LIGHT AND POWER

Applicant shall make their own arrangements for obtaining temporary light and power as required for the work, and shall maintain such temporary facilities in a proper and safe condition, including compliance with applicable codes.

3.05 TEMPORARY WATER

Applicant shall make their own arrangements for obtaining all temporary water service as required for the work.

3.06 TEMPORARY TRAFFIC CONTROLS

Applicant shall cooperate with the directives of the MBTA and/or Railroad Company(s) regarding vehicular traffic control and provide any temporary controls or devices required to eliminate or minimize congestion or obstruction of vehicular traffic caused by the work, including use of designated routes of ingress and egress from the work area.

3.07 TEMPORARY WORK AND STORAGE AREAS

- A. The areas designated by the MBTA as the temporary parking, work and storage area(s) will be provided to the Applicant in accordance with the terms of the MBTA License Agreement.
- B. All designated temporary parking, work and storage areas used by the Applicant shall be restored to their original condition prior to completion of the work, subject to inspection and approval of the MBTA and the Railroad Company(s).

3.08 POLLUTION ABATEMENT CONTROLS

Applicant shall:

- A. Conduct operations in a manner to minimize pollution of the environment surrounding the area of work by every means possible. Specific controls shall be provided as follows:
 - 1. Vehicles: All vehicles and material transport trucks leaving the site and entering paved public streets shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. Trucks arriving at or leaving the site with materials shall be loaded in a manner which will prevent dropping of materials or debris on the streets. Spills of materials in public areas shall be removed immediately at no cost to the MBTA or Railroad Company(s).

2. Waste Materials: No waste or erosion materials shall be allowed to enter natural or man-made water or sewage removal systems. Erosion materials from excavations, borrow areas or stockpiled fill shall be contained within the work area. The Applicant shall develop methods for control of waste and erosion which shall include such means as filtration, settlement and manual removal to satisfy the above requirements. Do not dispose of machinery lubricants, fuels, coolants and solvents on the site. If hazardous waste is encountered, the Applicant shall dispose of it in accordance with all federal, state and local codes. Verification of proper disposal must be provided, in writing, to the MBTA and the Railroad Company(s).
 3. Burning: No burning of waste shall be allowed without prior written permission. In cases where permission is granted, burning shall be conducted in accordance with the regulations of the appropriate jurisdictional agency.
 4. Dust Control: The Applicant shall at all times control the generation of dust by their operations. Control of dust is mandatory and shall be accomplished by water sprinkling or by other methods approved by the MBTA or Railroad Company(s).
 5. Noise Control: The Applicant shall take every action possible to minimize the noise caused by their operation. When required by agencies having jurisdiction, noise producing work shall be performed during less sensitive hours of the day or week as directed by the MBTA or Railroad Company(s) or as required by local ordinance.
 6. Environmental: All local and state environmental laws will be strictly adhered to. All applications, permits, licenses, approvals, etc., will be the sole responsibility of the Applicant.
- B. Submit a program for pollution control with applicable licenses and permits for all piping carrying non-potable liquids, gases or other pollutants.

3.09 PROTECTION OF PERSONS AND PROPERTY

A. Safety Requirements

1. The Applicant must adhere to the most stringent provisions of the applicable statutes and regulations of the political subdivision in which the work is being performed. The Applicant must also observe the Department of Labor-

Occupational Safety, Health Administration provision, pertaining to the safe performance of the work, and further, the methods of performing the work must not involve undue danger to the personnel employed thereon, Railroad Company(s) employees, the public, or to public and private property. Should charges of violation of any of the above be issued to the Applicant in the course of the work, a copy of each charge shall immediately be forwarded to the Railroad Company(s). The Applicant shall pay all fines and penalties levied against him.

2. The Applicant shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection. This includes posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

B. Safety of Persons and Property - The Applicant shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

1. All employees on the work site and all other persons who may be affected.
2. All materials and equipment, whether in storage on or off the site, under the care, custody or control of the Contractor or any of their subcontractors.
3. Other property at the site or adjacent thereto, including walks, pavements, roadways, structures, and utilities not designated for removal, relocation or replacement in the course of construction. Any damage to such items shall be restored to original condition by the Applicant at no cost to the MBTA or Railroad Company(s).

C. First Aid

The Applicant shall maintain adequate first aid supplies at the site as prescribed by Federal, State or Local codes and regulations.

D. Use of Explosives

Non blasting methods are preferred. See "Blasting Specifications."

E. Site Security

The Applicant shall:

1. Maintain a secure work site protecting the MBTA and the Railroad Company(s) interests and property from claims arising from trespass, theft and vandalism.
2. Permit access to the work site only to employees, Contractors and those persons having business related to the work.
3. Provide security measures as required to protect Contractor or subcontractor's tools, equipment and property from damage, theft or vandalism.
4. Assume all costs for any MBTA and/or local police details required by the work.

3.10 VERMIN CONTROL

- A. Do not permit food scraps, lunch bags, food wrappers or other items which would attract rats or other vermin to be left lying around the site. Deposit such items in closed, rat-proof metal containers for disposal on a regular basis.
- B. The Applicant must provide vermin control as required by the MBTA or Railroad Company(s).

3.11 RUBBISH AND DEBRIS REMOVAL

- A. Rubbish and debris resulting from the work must be neatly piled in a single location and legally disposed of at least once a week. If rubbish or debris interferes with railroad activities, or creates a fire or safety hazard, it must be removed on a more frequent basis.
- B. Volatile waste such as mineral spirits, oil, or paint thinner shall not be disposed of in storm or sanitary drains, streams or waterways or any location upon the site.

SECTION 4. PIPELINE OCCUPANCY GENERAL CRITERIA

GENERAL:

4.01 METHOD OF INSTALLATION:

- A In a public way:
 1. No work shall be done without a Railroad Company(s) Inspector present.
 2. Open cuts will not be allowed in or immediately adjacent to an at

grade crossing. Sleeves will be installed by the jerking method, unless otherwise approved by the Director of Engineering for MBTA Railroad Operations.

3. Jerking is the preferred method of installation in or immediately adjacent to and at grade crossing. The sleeve may be installed by the open cut method with the Applicant paying for the complete rebuilding of the crossing, pending approval of the Director of Engineering for MBTA Railroad Operations. Approval will be given only under very unusual circumstances.
4. Jacking is the preferred method of installation in or immediately adjacent to and at grade crossing scheduled for rebuilding. The sleeve may be installed by the open cut method within seven (7) calendar days of the scheduled date of the crossing reconstruction. In the case of any open cut, strict adherence shall be made to the backfill specifications which provide the MBTA with written certification from a testing lab or Professional Engineer, that the backfill density requirements of the MBTA specifications have been met or exceeded.

B. Not within a Public Way:

The preferred 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, the following: (1) track usage, (2) depth of cut, (3) soil conditions, (4) physical restraints. In the event an open cut is allowed, the following items shall be adhered to, and (5) any other circumstances which may necessitate an open cut.

1. The installation is to be a continuous operation and performed according to an MBTA approved schedule.
2. No work shall be done without a Railroad Company(s) Inspector present.
3. MBTA backfill specifications by the Owner or its Contractor.
4. The Owner or its Contractor may be required to provide 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 payments for Drawings and specification review, flagging, inspection, etc. (also required from the Owner or its Contractor before they enter upon MBTA property.)

4.02 GENERAL REQUIREMENTS

- A. Pipelines under or across MBTA tracks on rights-of-way shall be encased in a larger pipe or conduit called the casing pipe as indicated in Plate II.
- B. Casing pipe will be required for all pipelines carrying oil, gas, petroleum products, or other flammable, highly volatile substances which, from their nature or pressure, might cause damage if escaping on or near MBTA Railroad Property.
- C. For non-pressure sewer or drainage crossings where the installation can be made without interference to railroad operations, the casing pipe may be omitted when the pipe strength is capable of withstanding railroad loading. This type of installation must be approved by the Director of Engineering for MBTA Railroad Operations.
- D. The casing pipe shall be laid across the entire width of the right-of-way. Casing pipe shall extend beyond the right-of-way when the right-of-way line on either side of the tracks is less than the minimum length of casing specified in Section 6, Para. 6.01(E).
- E. Pipelines laid longitudinally on railroad right-of-way shall be located in accordance with Plate III. If located within 25 feet of the closest rail of any track or closer than 45 feet to nearest point of any bridge, building or other structure, the carrier pipe shall be encased.
- F. Where practicable, pipelines shall be located to cross the tracks at approximate right angles, but preferably at not less than 45 degrees.
- G. Pipelines shall not be placed within a culvert, under railroad bridges, or closer than 45 feet to any portion of a railroad bridge, building, or other structure, except in special cases, and then by special design, as approved by the Director of Engineering for MBTA Railroad Operations.
- H. Pipelines carrying liquefied petroleum gas shall, where practicable, cross the railroad where tracks are carried on embankment.
- I. Any replacement or modification of an existing carrier pipe and/or casing shall be considered a new installation, subject to the requirements of these Specifications.
- J. Where laws or orders of public authority prescribe a higher degree of protection than specified herein, the higher degree so prescribed shall be deemed a part of these Specifications.

- K. Pipelines and casings shall be suitably insulated from underground conduits carrying electric wires on MBTA Railroad Property.

4.03 INSPECTION AND TESTING

For pipelines carrying flammable or hazardous materials, ANSI Codes B 31.8 and B 31.4, current at time of constructing the pipeline, shall govern the inspection and testing of the facility on MBTA Railroad Property, except that proof-testing of strength of carrier pipe shall be in accordance with the requirements of ANSI Code B 31.4, as applicable, for all pipelines carrying all liquefied petroleum gas, natural or manufactured gas, and other flammable substances.

4.04 CATHODIC PROTECTION

- A. Cathodic protection shall be applied to all pipelines and casings carrying flammable substances.
- B. Where casing and/or carrier pipe is cathodically protected by other than anodes, the Director of Engineering for MBTA Railroad Operations shall be notified and suitable testing shall be made. This testing shall be witnessed by the Railroad Company(s) to insure that other railroad structures and facilities are adequately protected from the cathodic current in accordance with the recommendations of Reports of Correlating Committee on Cathodic Protection, current issue by the National Association of Corrosion Engineers.

4.05 SOIL INVESTIGATIONS

- A. Soil borings (or other soil investigations approved by the Railroad Company(s)) will be performed to determine the nature of the underlying material for all pipe crossings under tracks. See Test Boring Specifications.
- B. Borings shall be made on each side of the tracks, on the centerline of the pipe crossing, and as close to the tracks as practicable.
- C. Soil borings shall be in accordance with the current issue of the American Railway Engineering Association Specifications, Chapter 1, Part 1, "Specifications for Test Borings". Soils shall be investigated by the split-spoon and/or thin-walled tube method and rock shall be investigated by the Boring method specified therein.
- D. Soil boring logs shall clearly indicate all of the following:
 - 1. Boring number as shown on boring location Drawing.

2. Elevation of ground at boring, using same datum as the pipeline Construction Drawings.
 3. Description or soil classification of soils and rock encountered.
 4. Elevations or depth from surface for each change in strata.
 5. Identification of where samples were taken and percentage of recovery.
 6. Location of ground water at time of sampling and, if available, subsequent readings.
 7. Natural dry density in lbs./sq.ft. for all strata.
 8. Unconfined compressive strength in tons/sq.ft., for all strata.
 9. Water content (percent). Liquid limit (percent) and plastic limit (percent).
 10. Standard penetration in blows/ft.
- E. The location of the carrier pipe and casing shall be superimposed on the boring logs before submission to the Director of Engineering for MBTA Railroad Operations.
- F. Soil investigation by auger, wash, or rotary drilling method is not acceptable.
- G. Soil boring logs shall be accompanied by a Drawing drawn to scale showing location of borings in relation to the tracks and the proposed pipe location, the elevation of around surface at each boring, and the elevation of the base of rail of the tracks.

4.06 GROUND STABILIZATION

Soil stabilization shall take place prior to the start of jacking. Stabilization shall be achieved by dewatering, grouting or a combination of both to maintain the stability of the face of the heading.

- A. The Owner or its Contractor shall lower and maintain the ground water level a minimum of two (2) feet below the invert at all times during construction by well points, vacuum well points, or deep wells to prevent inflow of water and/or 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.
- B. 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.

- C. Railroad Company(s) forces will survey the crossing prior to, during and after construction. If it is necessary to align or surface the tracks as a result of construction, the Railroad Company(s) will perform the work at the expense of the Owner or the Owner's Contractor.

4.07 SUPPORT OF TRACKS

- A. When jacking, boring, or tunneling, temporary track support structures shall be installed. The track support structures shall be provided by the Applicant and installed by the Railroad Company(s) at the Applicant's expense. The Contractors proposed type of temporary track support structures shall be subject to the approval of the Railroad Company(s)
- B. All work involving rail, signals, ties and other track material will be performed by the Railroad Company(s) at the Applicant's expense.
- C. The Applicant shall deliver the track support structures to a site approved by the Railroad Company(s). Provisions for unloading shall be provided by the Applicant at no expense to the Railroad Company(s) and the Applicant shall provide the necessary labor to handle the material for pre-installation inventory.

4.08 GEOTECHNICAL MONITORING

THE FOLLOWING SPECIFICATIONS ARE REQUIRED FOR ALL PIPE JACKING OPERATIONS.

- A. Jacking shall be performed on a continuous basis, 24 hours per day, and 7 days per week.
- B. The monitoring points shall be set up one week before the jacking operation begins. The MBTA and Railroad Company(s) shall be notified. Elevation readings shall begin two days prior to the start of jacking and continue for a minimum of two weeks after the completion of the jacking operation. Initial readings immediately after any surfacing operations shall serve as new baseline figures. All future elevation readings shall be compared to the adjusted baseline. If the

track deviates to a condition not acceptable to the MBTA or Railroad Company(s), corrections shall be made at the proponent's expense.

- C. Elevation readings shall be taken from the top rail of each track.
- D. Elevation readings shall be taken every four hours or two times per shift, i.e., six times per day. The readings shall be faxed to the MBTA and Railroad Company(s) on a daily basis and all information is to be presented in legible print. Additional readings may be required by the MBTA or Railroad Company(s).
- E. Stations shall be spaced at 15-1/2 foot intervals. The number of stations required shall be determined by the depth of the pipe. There shall be a minimum of two stations on either side of the centerline jacking. Additional stations may be required at the discretion of the MBTA or Railroad Company(s),
- F. Elevation readings must show the date, time, weather conditions and temperature. Each reading must also provide the following information: track number, compass direction, station number, base elevation (with date), static elevation, change in elevation (recorded in hundredths and in inches), dynamic reading and total deflection in inches. See sample sheet attached.
- G. Station "0" shall be located at the centerline of the pipe jacking with Stations 1 and being to the right and Stations -1 and -2 being to the left when standing in the gauge of the near track and looking at the receiving pit. In multiple track areas the stations as determined herein are to be carried across each track perpendicular to the near track.
- H. Elevation readings taken from the top of the rail for static measurement and the dynamic readings shall be combined and the sum compared to the adjusted baseline. This reading will demonstrate the difference in elevation caused by the jacking operation.
- I. The MBTA requires that the truck be maintained at all times within established criteria for the specific track classification. At the completion of the project the requirement for tamping and realigning the tracks, caused by the settlement from the construction activity, remains with the Contractor for the duration as specified by the MBTA in their initial review of the work plans. This tamping and track realignment will be performed by the MBTA or Railroad Company(s) at the sole expense of the Contractor.

4.09 PIPELINES ON BRIDGES

- A. Pipelines carrying flammable or non-flammable substances which by their nature might cause damage if escaping on or near railroad facilities or personnel shall not be installed on bridges over railroad tracks or bridges carting railroad tracks.
- B. The Director of Engineering for MBTA Railroad Operations may approve such an installation when it is demonstrated that no practicable alternative is available.
- C. When allowed by the Director of Engineering for MBTA Railroad Operations, pipelines on bridges shall be located in a way to minimize the possibility of damage from vehicles, railroad equipment, vandalism and other external causes. Pipelines on bridges may be installed in a utility bay that is constructed between the girders of the bridge. The utility bay shall be protected from the environment by a removable shield bolted to the girders. This will allow utility companies to comply with the Code of Federal Regulations for Periodic Inspection.
- D. In the event of pipe relocation due to the reconstruction of a bridge, the installation of the new pipe must comply with the requirements in these Specifications.

4.10 BONDING AND GROUNDING OF PIPELINES IN ELECTRIFIED TERRITORY

- A. Carrier pipe shall be enclosed in a metal casing that is isolated from carrier pipe by approved insulators having a dielectric value of not less than 25 kV that provide an air gap between carrier pipe and casing of not less than 2 inches.
- B. Carrier pipe supporting hangers, mountings or cradles shall provide an insulation value of not less than 25 kV and an air gap of not less than 2 inches between casing and any portion of mounting assembly.
- C. Any grounding or isolation methods used must have a minimum dielectric of 25,000 volts.

4.11 ABANDONED PIPELINES OR FACILITIES

- A. For all pipeline occupations on the railroad right-of-way, the owner of the pipeline shall notify the MBTA, in writing, of the intention to abandon the pipeline. Upon abandonment the carrier pipe shall be removed and the casing shall be filled with cement grout, compacted sand or other material approved by the Director of Engineering for

MBTA Railroad Operations. If it is impractical to remove the carrier pipe, then the carrier must be filled along with the annular space between the casing and carrier.

- B. Facilities other than pipelines shall be removed or altered at abandonment to the satisfaction of the Director of Engineering for MBTA Railroad Operations.

4.12 DRAINAGE

- A. Occupancies shall be designed, and constructed, so that adequate and uninterrupted drainage of railroad right-of-way is maintained. If it becomes necessary to block a ditch, pipe or other drainage facility, the applicant shall install temporary pipes, ditches or other drainage facilities as required to maintain adequate drainage, as approved by the MBTA or Railroad Company(s). Upon completion of the work, the temporary drainage facilities shall be removed and the permanent facilities restored.
- B. Water may not be pumped or disposed of onto railroad rights-of-way unless discharged into an existing drainage facility, providing discharge does not cause erosion or leave sediment.
- C. When water runoff is disposed of onto MBTA Railroad Property, it must be demonstrated to the Railroad Company(s) that the existing drainage facility can accommodate the increased runoff. Drainage calculations stamped by a Registered Professional Engineer must accompany all requests to use railroad culverts or drainage ditches.
- D. If in the estimation of the Director of Engineering for MBTA Railroad Operations or their authorized representative, the railroad culvert or drainage ditch has to be cleaned in order to allow the increased flow to safely pass through the culvert, it must be cleaned at the expense of the applicant.

SECTION 5. CARRIER PIPE

GENERAL:

5.01 DESIGN CRITERIA

- A. If the maximum allowable stress in the carrier pipe on either side of the occupancy of MBTA Railroad Property is less than specified herein, the carrier pipe on MBTA Railroad Property shall be designed at the same stress as the adjacent carrier pipe.

- B. Requirements for carrier pipe under railroad tracks shall apply for a minimum distance equal to that of the casing pipe.
- C. Carrier pipes within a casing shall be designed for railroad live loads as if they were not encased.
- D. All pipes, ditches and other structures carrying surface drainage on MBTA Railroad Property and/or crossing under railroad tracks shall be designed to carry the run-off from a one hundred (100) year storm. Computations indicating this design and suitable topographic plans, prepared by a Registered Professional Engineer, shall be submitted to the Director of Engineering for MBTA Railroad Operations, or their authorized representative, for approval. If the drainage is to discharge into an existing drainage channel on railroad right-of-way and/or under railroad tracks, the computations should include the hydraulic analysis of any existing structures. Submitted with the computations should be formal approval of the proposed design by the appropriate governmental agency.

PRODUCTS:

5.02 GENERAL

- A. All pipes shall be designed for the external and internal loads to which they will be subjected. The dead load of earth shall be considered 120 pounds per cubic foot. Railroad live loading shall be Cooper's E-80 with 50% added for impact. On railroad right-of-way or where railroad loading will be experienced, the following shall be the minimum requirements for carrier pipes:
 - 1. Reinforced concrete pipe - ASTM Spec. C-76, Class V, Wall C.
 - 2. Ductile Iron Pipe - For Culverts and Gravity Sewers - ASTM Spec, A-142 Extra Heavy.

5.03 OIL AND GAS PIPES

- A. Pipelines carrying oil, liquefied petroleum gas, natural or manufactured gas and other flammable products shall conform to the requirements of the current ANSI B 31.4, with Addenda, "Liquefied Petroleum Transportation Piping Systems," ANSI B 31.8, "Gas Transmission and Distribution Piping Systems," and other applicable ANSI codes, except that the minimum allowable stresses for the design of steel pipe shall not exceed the following percentages of the specified minimum yield strength (multiplied by the longitudinal joint factor) of the pipe as defined in the ANSI Codes:

1. Steel pipe within a casing under, across and longitudinally on MBTA Railroad Property. (The following percentages apply to hoop stress):
 - a. Seventy-two percent for installation on oil pipelines.
 - b. Fifty percent for pipelines carrying liquefied petroleum gas and other flammable Liquids with low flash point.
 - c. Sixty percent for installations on gas pipelines.
 2. Steel pipe without a casing laid longitudinally on MBTA Railroad Property. (The following percentages apply to hoop stress):
 - a. Sixty percent for installations on oil pipelines.
 - b. Forty percent for pipelines carrying liquefied petroleum gas and other flammable Liquids with low flash point.
 - c. Forty percent for installations on gas pipelines.
- B. Design computations showing compliance with the requirements of Paragraph 5.03(A) above, and prepared by a Registered Professional Engineer, shall accompany the application for occupancy.
- 5.04 CAST IRON PIPE: For water and other materials under pressure shall conform to the current ANSI specifications A-21 Series 21/45 Iron strength with plain end, compression type or mechanical joints. The strength to sustain external railroad and other loadings shall be computed in accordance with the current ANSI A-21.1 "Thickness Design of Cast Iron Pipe."
- 5.05 VITRIFIED CLAY PIPE: ASTM Spec C-700, Extra Strength.
- 5.06 CORRUGATED METAL PIPE: AREA Spec Chapter I, Part 4
- 5.07 ASBESTOS CEMENT PIPE (Non-pressure): ASTM Spec. C-428, C1. 5000 Min. Pressure: AWWA Spec. C400, C1. 150 Min.
- 5.08 OTHER: Other miscellaneous piping not specified above shall be submitted to approval by the Director of Engineering for MBTA Railroad Operations.
- 5.09 SHUT-OFF VALVE
- A. Provide accessible emergency shut-off valves at each side of the railroad within distances and at locations as directed by the Chief Engineering Officer.

- B. Where pipelines are provided with automatic control stations and within distances approved by the Director of Engineering for MBTA Railroad Operations, no additional valves will be required.

5.10 SIGNS

- A. Prominently identify all pipelines at rights-of-way by durable, weatherproof signs located over the centerline of the pipe. Mark pipelines at under crossings on both sides of track. Signs shall display the following:
 - 1. Name and address of pipeline Owner.
 - 2. Contents of Pipe.
 - 3. Pressure in Pipe.
 - 4. Depth below grade at point of sign.
 - 5. Emergency telephone in event of pipe rupture.
 - 6. Railroad File Number.
- B. For pipelines running longitudinally on MBTA Railroad Property, place signs over the pipe (or offset and appropriately mark) at all changes in direction the pipeline. Locate signs so that when standing at one sign, the next adjacent marker in either direction is visible. In no event shall pipeline identification signs be placed more than 500 feet apart, unless otherwise directed by the Director of Engineering for MBTA Railroad Operations.
- C. Submit details of signs (materials, size, methods of support, etc.) to the Director of Engineering for MBTA Railroad Operations for approval.

EXECUTION:

5.11 INSTALLATION:

- A. Install carrier pipes in accordance with approved Construction Drawings, requirements of this specification, and all applicable codes and ordinances.
- B. Install carrier pipes with sufficient slack so they are not in tension.

SECTION 6. CASING PIPE

GENERAL:

6.01 DESIGN CRITERIA

- A. Casing pipe and joints shall be of metal and of leak-proof construction.
- B. Casing pipe shall be designed for the earth and/or other pressures present, and for railroad live load. The dead load of earth shall be considered 120 pounds per cubic foot. Railroad Live load shall be Cooper E-80 with 50g added for impact.
- C. The inside diameter of the casing pipe shall be such as to allow the carrier pipe to be removed subsequently without disturbing the casing or the roadbed. For carrier pipe less than six (6) inches in diameter, the inside diameter of the casing pipe shall be at least two (2) inches greater than the largest outside diameter of the carrier pipe joints or couplings. For carrier pipe six (6) inches and over in diameter, the inside diameter of the carrier pipe shall be at least four (4) inches greater than the largest outside diameter of the carrier pipe joints or couplings.
- D. For flexible casing pipe, a minimum vertical deflection of 3 percent of its diameter, plus 1/2 inch, shall be provided so that no loads from the roadbed, track, traffic or casing pipe itself are transmitted to the carrier pipe. When insulators are used on the carrier pipe, the inside diameter of the flexible casing pipe shall be at least two (2) inches greater than the outside diameter of the carrier pipe for pipe less than eight (8) inches in diameter; at least 3-1/4 inches greater for pipe 8 to 16 inches in diameter, and at least 4-1/2 inches greater for pipe 18 inches and over in diameter. In no event shall the casing pipe diameter be greater than is necessary to permit the insertion of the carrier pipe.
- E. Casing pipe under railroad tracks and across MBTA Railroad Property shall extend the greater of the following distances, measured at right angles to centerline of track:
 - 1. Across the entire width of MBTA Railroad Property.
 - 2. Two (2) feet beyond ditch line.
 - 3. Three (3) feet beyond toe of slope.
 - 4. A minimum distance of 25 feet each side from centerline of outside track when casing is sealed at both ends.
 - 5. A minimum distance of 45 feet from centerline of outside track when casing is open at both ends.

F. If additional tracks are constructed in the future, the casing shall be extended at the expense of the Applicant.

G. Table of Live Loads

LIVE LOADS, INCLUDING IMPACT, FOR VARIOUS HEIGHTS OF COVER
FOR COOPER E- 80

COVER (FT)	LOAD (PSF)	COVER (FT)	LOAD (PSF)	COVER (FT)	LOAD (PSF)
2	3800	10	1100	20	300
5	2400	12	800	30	100
8	1600	15	600		

6.02 PROTECTION AT ENDS OF CASING

- A. Casings for carriers of flammable substances shall be sealed to the outside of the carrier pipe. Details of seals shall be shown on the Drawings.
- B. Casings for carriers of non-flammable substances shall have both ends of the casing blocked in such a way as to prevent the entrance of foreign material, but allowing leakage to pass in the event of a carrier break.
- C. Where ends of casing are at or above ground surface and above high water level, they may be left open, provided drainage is afforded in such a manner that leakage will be conducted away from railroad tracks and structures.

6.03 VENTS

- A. Sealed casings for flammable substances shall be properly vented. Vent pipes shall be of sufficient diameter, but in no case less than two (2) inches in diameter, and shall be attached near each end of the casing and project through the ground surface at right-of-way lines or not less than 45 feet (measured at right angles from centerline of nearest track).
- B. Vent pipes shall extend at least four (4) feet above the ground surface. Top of vent pipe shall have a down-turned elbow, properly screened, or a relief valve. Vents in locations subject to high water shall be extended above the maximum elevation of high water and shall be supported and protected in a manner approved by the Director of Engineering for MBTA Railroad Operations.
- C. Vent pipes shall be at least four (4) feet from the closest aerial electric

wires.

- D. When the pipeline is in a public highway, street-type vents shall be installed.

PRODUCTS:

6.04 STEEL PIPE

The minimum yield strength for steel pipe shall be 35,000psi. Smooth wall pipes with a nominal diameter greater than 70 inches require special approval by the Director of Engineering for MBTA Railroad Operations. See Plate V, "Table of Minimal Wall Thickness for Steel Casing Pipe."

6.05 CAST IRON PIPE

May be used for a casing, provided the method of installation is by open trench. Cast iron pipe shall conform to ASTM Specification A-142, Extra Heavy. The pipe shall be of the mechanical joint type or plain end type with compression type couplings.

6.06 CORRUGATED METAL PIPE AND CORRUGATED STRUCTURAL PLATE PIPE

May be used for casing only when emplaced by the open-cut method. Jacking or boring through railroad embankment is not permitted. Pipe shall be bituminous coated and shall conform to AREA Specifications Chapter 1, Part 4.

6.07 REINFORCED CONCRETE PIPE

Shall conform to ASTM Specification C 76, Class V, Wall C. It shall be used only in the open cut and jacking methods of installation. If concrete pipe is to be jacked into place, grout holes tapped for at least 1-1/2 inch pipe spaced at approximately 8 feet around the circumference and approximately 4 feet longitudinally shall be cast into the pipe at manufacture. Immediately upon completion of jacking operations, the installation shall be pressure grouted.

6.08 TUNNEL LINER PLATES

Shall be four flange and otherwise conform to American Railway Engineering Association Specifications Chapter 1, Part 4. In no event shall the liner plate thickness be less than 0.1046 inches. Tunnel liner plates are to be used only to maintain a tunneled opening until the carrier pipe is installed. After installation the annular space between the carrier and liner must be filled

with 1:6 cement grout or lined with 6 inches of concrete, reinforced with 6x6-6/6 wire mesh for tunnels up to 108 inches in diameter. Required thickness of lining for larger tunnels shall be determined by span and structural analysis. Manufacturer's Shop Detail Drawings and manufactures computations showing the ability of the tunnel liner plates to resist the jacking stresses shall be submitted to the Director of Engineering for MBTA Railroad Operations for approval.

EXECUTION:

6.09 DEPTH OF INSTALLATION:

- A. Casing pipe under railroad tracks and across MBTA Railroad Property shall be at least 6-1/2 feet from top of rail to top of casing at its closest point. Under secondary or industrial tracks this distance shall be at least 5-1/2 feet. On other portions of MBTA Railroad Property where casing is not directly beneath any track, the depth from ground surface or from bottom of ditches to top of casing shall be at least four (4) feet, unless otherwise specified herein.
- B. Pipelines laid longitudinally on MBTA Railroad Property 50 feet or less from centerline of track shall be buried not less than five (5) feet from ground surface to top of pipe. This applies to all pipelines carrying oil, gas, petroleum products, or other flammable or highly volatile substances under pressure, and all non-flammable substances which by their nature or presence in the judgment of the Director of Engineering for MBTA Railroad Operations may be hazardous to life or property. For pipelines carrying water, sewage and non-flammable substances, the distance from surface of ground to top of pipe shall not be less than four (4) feet.
- C. Pipelines located within the line of track live load influence (as shown on Plates II and III) are subject to railroad loading and require a casing or are to be of special design approved by the Director of Engineering for MBTA Railroad Operations. All longitudinal occupation locations must be approved by the Chief Engineering Officer.
- D. The minimum cover shall be at least three (3) feet when pipeline is laid more than 50 feet from center line of track.
- E. Pipelines installed under or adjacent to any overhead structure must be a minimum of 29 feet from the bottom of the structure to the top of the casing. Such installations must comply with the above requirements.

6.10 METHOD OF INSTALLATION

- A. The Owner or its Contractor shall submit to the Director of Engineering for MBTA Railroad Operations, data and information demonstrating that the Contractor or their subcontractors have had successful previous experience in jacking, or using the proposed method of installation, in similar situations.
- B. 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, they shall proceed in a continuous operation without stopping. This will minimize the tendency of the material to freeze around the pipe.
- 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. After completion of the sleeve installation the annular space around it shall be completely grouted with cement grout under pressure.
- D. Casing pipe ends shall be beveled with a single V-groove toe 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.

Alternate method: The casing pipe may be jacked without being butt welded through the use of a continuous 1/2"x12" interior collar plate. The collar plate shall be welded completely upon completion of the jacking operation. All welding shall conform to the latest A.W.S. Welding Code, and shall be performed by a certified welder.

6.11 CONSTRUCTION:

- A. The casing pipe shall be constructed so as to prevent leakage of any substance from the casing throughout its length, except where the ends are left open, or through vent pipes when the ends are sealed. The casing shall be installed so as to prevent the formation of a waterway under the railroad, shall have an even bearing throughout its length, and shall slope to one end (except for longitudinal occupancy).
- B. Casing pipes shall be installed by the following methods:

1. Jacking

- a. This method shall be in accordance with the most current edition of the American Railway Engineering Association Specifications, "Jacking Culvert Pipe Through Fills." This operation shall be conducted without hand mining ahead of the pipe and without the use of any type of boring, auguring, or drilling equipment.
- b. Bracing and backstops shall be designed and jacks of sufficient rating used so that the jacking will be continuous.

2. Drilling

This method employs the use of an oil field type rock roller bit or a plate bit made up of individual roller cutter units which are welded to the pipe casing being installed and which are turned as it is advanced. The pipe is turned for its entire length from the drilling machine to the ground being drilled. A high density slurry is injected through a small supply line to the head which acts as a cutter lubricant. This slurry is injected at the rear of the cutter units to prevent any jetting action ahead of the pipe. The drilling machine runs on a set of steel rails and is advanced (thus advancing the pipe) by a set of hydraulic jacks. The method is the same whether earth or rock is being drilled. Any other drilling methods shall be submitted to the Director of Engineering for MBTA Railroad Operations for approval.

3. Tunneling

- a. Tunneling operations shall be conducted as approved by the Railroad Company(s). Care shall be exercised in trimming the surface of the excavated section in order that the steel liner plates fit snugly against the undisturbed material. Excavation shall not be advanced ahead of the previously installed liner plates any more than is necessary for the installation of the succeeding liner plate. The vertical face of the excavation shall be supported as necessary to prevent sloughing. At any interruption of the tunneling operation, the heading shall be completely bulkheaded. Tunneling shall be conducted continuously, on a 24 hour basis until the tunnel liners extend at least one foot beyond the railroad line of influence.
- b. When tunneling, tight breasting must be maintained around the entire face. On any shutdowns (under or beyond railroad influence line, see Plate II), the entire

face shall be fully breasted and packed with hay.

- c. The tail void shall be filled with pea stone (or other approved material) simultaneously with each advancement of the shield.
- d. An ample supply of hay and/or sandbags must be kept at the site to fill any voids caused by the removal of large stones or other obstructions extending outside the shield.
- e. A uniform mixture of 1:6 cement grout shall be placed under pressure behind the liner plates, in addition to the previously placed pea stone. Grout holes, tapped for at least 1-1/2 inch pipe and spaced 3 feet around the tunnel liner, shall be placed in every other ring. Grouting shall start at the lowest dole and proceed upwards. A threaded plug shall be installed in each grout hole as the grouting is completed at that hole.
- f. Grouting shall be kept as close to the heading as possible, using grout stops behind the liner plates. If necessary, grouting shall proceed as directed by the Railroad Company(s), but in no event shall more than six lineal feet of tunnel be progressed beyond the grouting.

4. Tunneling Shields

- a. All pipes 70 inches and larger in diameter shall be emplaced with the use of a tunneling shield, unless otherwise approved by the Director of Engineering for MBTA Railroad Operations. Pipes of smaller diameter may also require a shield when, at the sole discretion of the Director of Engineering for MBTA Railroad Operations, soil, or other conditions indicate its need.
- b. The shield shall be of steel construction, designed to support railroad track loading as specified in Paragraph 6.01 B herein, in addition to other loadings it must sustain. The advancing face shall be provided with a hood, extending no less than 20 inches beyond the face and extending around no less than the upper 240 degrees of the total circumference. Installations made with liner plates shall be provided with a full 360 degree shield. It shall be of sufficient length to permit the installation of at least one complete ring of liner plates within the shield before it is advanced for the installation of the next ring of liner plates. It shall conform to and not exceed the outside dimensions of the pipe being emplaced by more than one inch at any point in the periphery.

- c. The shield must be adequately braced and provided with necessary appurtenances for completely bulkheading the face with horizontal breastboards, and arrange so that the excavation can be benched as may be necessary. Excavation shall not be advanced beyond the edge of the hood, unless otherwise approved by the Railroad Company(s).
- d. Manufacturer's Shop Detail Drawings and computations showing the ability of the tunnel liner plates to resist the jacking stresses shall be submitted to the Director of Engineering for MBTA Railroad Operations for approval.
- e. For jacking reinforced concrete pipe, the shield shall be fabricated as a special section of reinforced concrete pipe with the steel cutting edge, hood, breasting attachments, etc., cast into the pipe. The wall thickness and reinforcing shall be designed for the jacking stresses.
- f. Grout holes tapped for no less than 1-1/2 inch pipe, spaced at approximately 3 foot centers around the circumference of the shield (or the aforementioned special reinforced concrete section) and no more than 4 foot centers longitudinally shall be provided.
- g. Detail Drawings sufficient to determine the adequacy of the shield, accompanied with design calculations prepared by a Registered Professional Engineer, shall be submitted to the Director of Engineering for MBTA Railroad Operations for approval and no work shall proceed until such approval is obtained.

5. Boring

- a. This method consists of pushing the pipe into the fill with a boring auger rotating within the pipe to remove the spoil. When augers, or similar devices, are used for pipe emplacement, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than one-half inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.
- b. Drawings and descriptions of the auger stop arrangement to be used shall be submitted to the Director of Engineering for MBTA Railroad Operations for approval,

and no work shall proceed until such approval is obtained and the arrangement is inspected in the field by the Railroad Company(s).

- c. The use of water or other Liquids to facilitate casing emplacement and/or spoil removal is prohibited.
 - d. Any method which employs simultaneous boring and jacking or drilling and jacking for pipes over 8 inches in diameter which does not have the above approved arrangement WILL NOT BE PERMITTED. For pipes 8 inches and less in diameter, augering or boring without this arrangement may be considered for use only as approved by the Director of Engineering for MBTA Railroad Operations.
- C. If an obstruction is encountered during the installation which stops the forward action of the pipe, and it becomes evident that it is impossible to advance the pipe, operations shall cease and the pipe shall be abandoned in place and filled completely with grout, in accordance with Section 4, Paragraph 4.10.
- D. Bored or jacked installations shall have a bored hole essentially the same as the outside diameter of the pipe plus the thickness of the protective coating. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe (plus coating) by more than 1 inch, grouting or other methods approved by the Railroad Company(s) shall be employed to fill such voids.
- E. Pressure grouting or freezing of the soils before or during jacking, boring, or tunneling may be required at the direction of the Railroad Company(s) to stabilize the soils, control water, prevent loss of material and prevent settlement or displacement of the embankment and/or tracks. Grout shall be cement, chemical or other special injection material selected to accomplish the necessary stabilization.
- F. The materials to be used and the method of injection shall be prepared by a Registered Professional Engineer (Geotechnical), or by an experienced and qualified company specializing in this work and submitted for approval to the Railroad Company(s) before the start of work. Proof of experience and competency shall accompany the submission.
- G. When water is expected to be encountered, pumps of sufficient capacity shall be provided and maintained at the site, and continually attended on a 24-hour basis, until in the sole judgment of the Railroad Company(s), their operation can be safely halted.

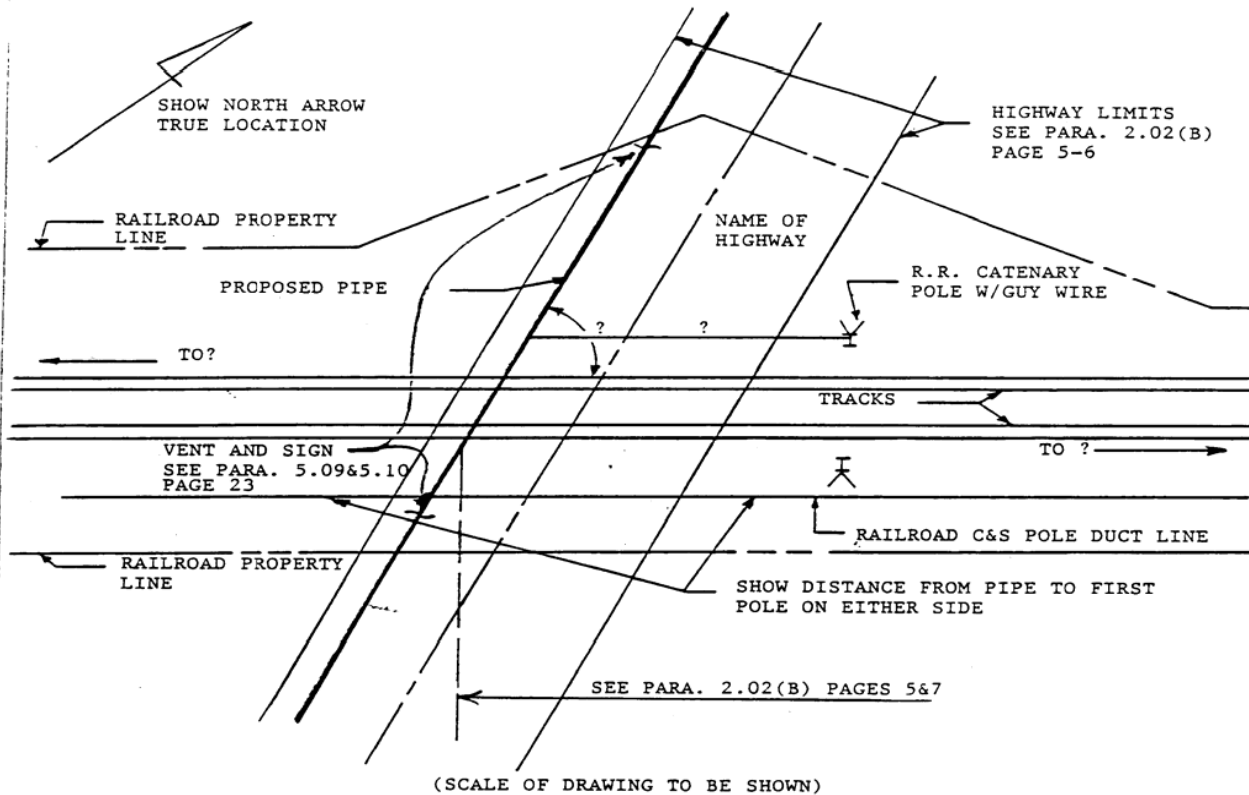
When dewatering, close observation shall be maintained to detect any settlement or displacement of railroad embankment, tracks, and facilities.

- H. Proposed methods of dewatering must be submitted to the Railroad Company(s) for approval prior to implementation. The discharge from the dewatering operations in the vicinity of the railroad shall be carefully monitored. If in the opinion of the Railroad Company(s), there is an excessive loss of fine soil particles at any time during the dewatering process, the dewatering shall be halted immediately. The dewatering operation cannot resume until the unsatisfactory condition is remedied to the satisfaction of the Railroad Company(s).

PLATE I

PIPE CROSSING

INFORMATION TO BE SHOWN ON PLAN SECTION OF DRAWING



NOTE:

IF MANHOLES ARE PLACED ON MBTA RAILROAD PROPERTY, DETAILS OF SAME, WITH CLEARANCES TO THE CENTERLINE OF THE NEAREST TRACK ARE TO BE SHOWN ON THE DRAWINGS.

IF THE PROPOSED PIPE IS TO SERVE A NEW DEVELOPMENT, A MAP SHOWING THE AREA IN RELATION TO ESTABLISHED AREAS AND ROADS IS TO BE SENT WITH THE REQUEST.

THE PROPOSED PIPE IS NOT WHOLLY WITHIN HIGHWAY LIMITS, THE SAME INFORMATION IS REQUIRED AS SHOWN ON THIS PLATE.

PLATE II

PIPE CROSSING

INFORMATION TO BE SHOWN ON PROFILE SECTION OF DRAWING

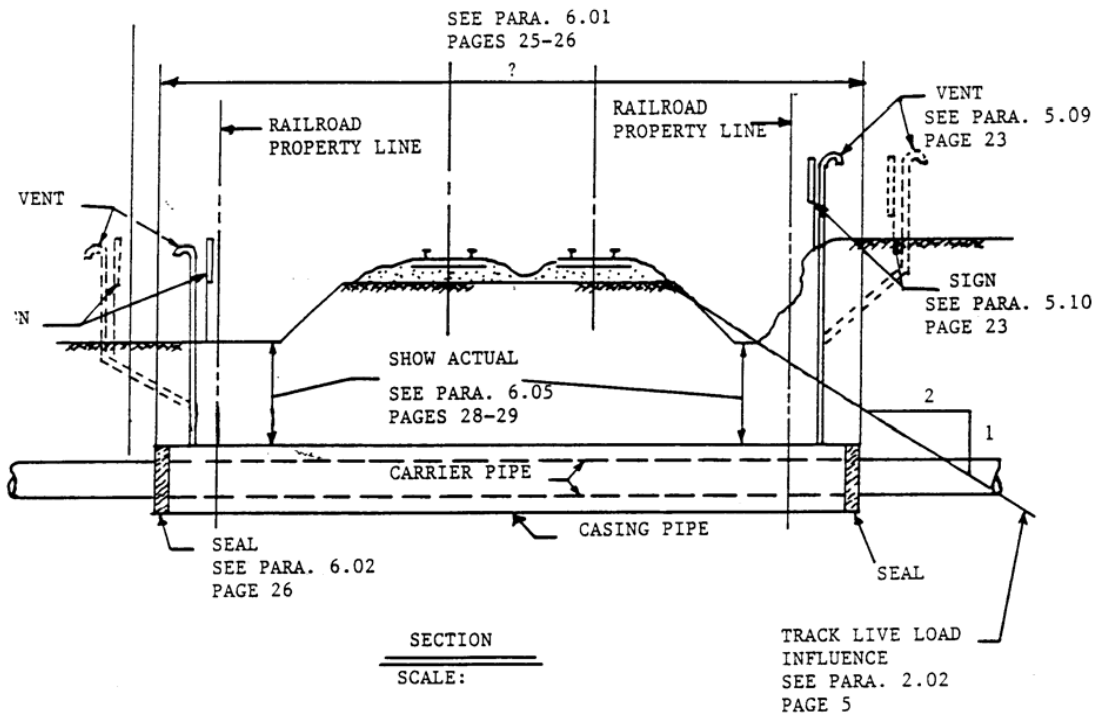
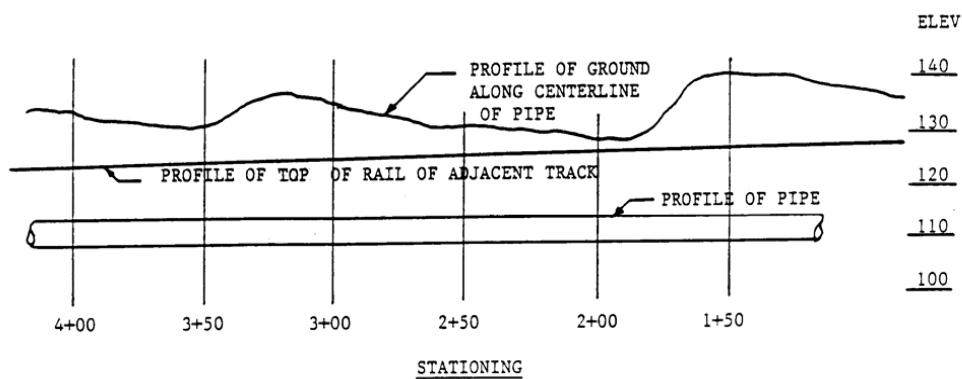
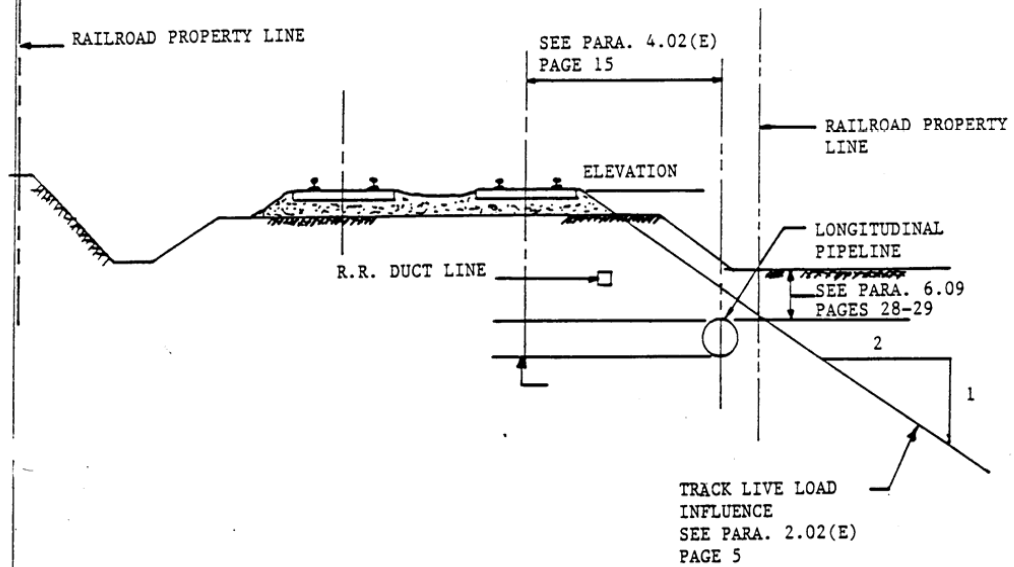


PLATE III

LONGITUDINAL OCCUPANCY



PROFILE - SEE PARA. 2.02
PAGES 5-7

SCALE - HOR:
VER:

PIPE CROSSING DATA SHEET

PLATE IV

In addition to plan and profile of crossing, Drawings submitted for the Railroad Company(s) approval shall contain the following information:

	<u>Pipe Date</u>	
	<u>Carrier Pipe</u>	<u>Casing Pipe</u>
Contents To Be Handled	_____	_____
Normal Operating Pressure	_____	_____
Normal Size of Pipe	_____	_____
O.S. Diameter	_____	_____
I.S. Diameter Wall	_____	_____
Thickness Weight	_____	_____
Per Foot Material	_____	_____
Process of Manufacture	_____	_____
Specification	_____	_____
Grade or Class	_____	_____
Test Pressure	_____	_____
Type of Joint	_____	_____
Type of Coating	_____	_____
Details of Cathodic Protection	_____	_____
Details of Seal or Protection at Ends of Casing:	_____	_____
Method of Installation	_____	_____
Character of Subsurface: Material At the Crossing Location	_____	_____
Approximate Ground Water Level	_____	_____
Source of Information on Sub- surface conditions (Test Pits, Borings or Other)	_____	_____

NOTE: Any soil investigation made on MBTA Railroad Property, or adjacent to tracks shall be carried on under the supervision of the Railroad Company(s).

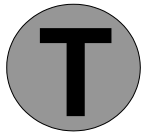
PLATE V

TABLE OF MINIMUM WALL THICKNESS FOR STEEL CASING PIPE
(FOR INFORMATION ONLY)

PROTECTED WALL THICKNESS

PIPE SIZE (INCHES)	WALL THICKNESS (PROTECTED)	
10	0.375	I
12	0.375	
14	0.375	
16	0.375	
18	0.375	
20	0.375	
22	0.375	
24	0.375	
26	0.375	
28	0.406	
30	0.469	
32	0.501	
34	0.532	
36	0.532	
38	0.569	
40	0.569	
42	0.569	
44	0.594	
46	0.688	
48	0.688	
50	0.688	
52	0.813	I
54	0.813	
56	0.876	
58	0.876	
60	0.876	
62	0.876	
64	0.876	
66	0.876	
68	0.876	
70	0.906	

NOTE: - FOR UNPROTECTED PIPE 26" AND UNDER ADD 0.032" TO PROTECTED WALL THICKNESS. FOR UNPROTECTED PIPE 28" AND OVER, ADD 0.063" TO PROTECTED WALL THICKNESS.



**MASSACHUSETTS BAY
TRANSPORTATION
AUTHORITY**

RAILROAD OPERATIONS DIRECTORATE

VII

TEMPORARY SHEETING AND SHORING

The following items are to be included in the design and construction procedures for all permanent and temporary facilities on, over, under, within or adjacent to MBTA Railroad Property:

1. Footings for all piers, columns, walls or other facilities shall be located and designed so that any temporary sheeting and shoring for support of adjacent track or tracks during construction will not be closer than toe of ballast slope. (See dimensions in the MBTA's Book of Standard Plans, #1000 and #1002 for tangent and curved track). Sheeting shall be required when excavation is inside of a line which extends horizontally from 5.5 feet off center line of adjacent track, then on a 2 (horizontal) to 1 (vertical) slope. This is known as the zone of influence.
2. Where physical condition of design impose insurmountable restrictions requiring the placing of sheeting closer than specified above, the matter must be submitted to the Director of Engineering for MBTA Railroad Operations for approval of any modifications.
3. When support of track or tracks is necessary during construction of above mentioned facilities, interlocking steel sheeting adequately braced and designed to carry E-80 live load plus 50% impact is required. Soldier piles and lagging will be permitted for supporting adjacent track or tracks only when required penetration of steel sheet piling cannot be obtained or when in the opinion of the Director of Engineering for MBTA Railroad Operations, or their authorized representative, steel sheet piling would be impracticable to place.
4. Exploratory trenches, three (3) feet deep and fifteen (15) inches wide in the form of an "H" with outside dimensions matching the outside of sheeting dimensions are to be hand dug, prior to placing and driving steel sheeting, in areas where railroad underground installations are known to exist. These trenches are for exploratory purposes only and are to be backfilled and compacted immediately. This work must be done in the presence of a railroad inspector.
5. Absolute use of track is required while driving sheeting adjacent to any track. Procedure for arranging the use of track shall be through the Railroad Company(s) representative on the project.
6. Cavities adjacent to sheet piling, created by driving of sheet piling, shall be filled with sand and any disturbed ballast must be restored and tamped immediately as required by the Railroad Company(s).
7. Sheet piling shall be cut off at top of tie during construction. After construction and backfilling has been completed, the piling within twelve (12) feet from centerline of track shall be cut off 24" below bottom of tie or 24" below finished grade, whichever is greater. Sheeting, used as a form on a permanent

structure, shall be cut as directed by the Railroad Company(s).

8. The excavation adjacent to the track shall be covered and protected by handrails and barricades, warning lights shall be provided by the Contractor as directed by the Railroad Company(s).
9. Graded 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. Material in the vicinity of sheet pile shall be compacted to not less than 95 percent of AASHTO T 99, Method C. The Contractor shall be required to supply, to the job site, ballast stone as prescribed herein to be installed by the Railroad Company(s).
10. The Contractor is to advise the Railroad Company(s) of the time schedule of each operation and obtain approval of the Railroad Company(s) for all work to be performed adjacent to MBTA tracks so that it may be properly supervised by railroad personnel.
11. All Drawings for temporary sheeting and shoring shall be prepared and stamped by a Registered Professional Engineer and shall be accompanied by complete design computations when submitted for approval.
12. Particular care shall be taken to avoid erosion or filling of the Railroad Company(s) drainage facilities. Erosion and sediment control in the vicinity of the railroad shall be as approved by the Director of Engineering for MBTA Railroad Operations. Correction of disrupted Railroad Company(s) drainage facilities shall be at the Contractor's sole expense.

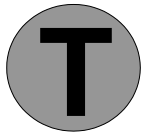
MBTA REQUIREMENTS FOR GEOTECHNICAL MONITORING

THE FOLLOWING SPECIFICATIONS ARE REQUIRED FOR ALL PILE DRIVING/EXCAVATING OPERATIONS:

1. Pile driving shall be on a continuous basis for each pile driven. Once a pile is started, it shall be driven or cut off at an elevation not to exceed the plane across the top of the rails of any track within 8'-6" plus 2" for each degree of curvature from centerline of track to the closest edge of the edge or excavation.
2. The monitoring points shall be set up one week before the pile driving or excavation operations begin. The MBTA and the Railroad Company(s) shall be notified. Elevation readings to establish the initial baseline reading shall begin two days prior to the start of driving. Readings shall be for a minimum of two weeks after the completion of the driving or backfilling of the excavation, whichever is longer. Initial readings immediately after any surfacing operations shall serve as new baseline figures. All future elevation readings shall be compared to the adjusted baseline. If the track deviates to a condition that is unacceptable to the MBTA or Railroad Company(s), corrections shall be made at the Contractor's expense.
3. Elevation readings shall be taken from the top of each rail of each track within the "zone of influence" the excavation. See Section 1, Page 1 of this specification.
4. Elevation readings will be taken once per eight hour shift. The readings shall be faxed to the MBTA Railroad Company(s) on a daily basis and all information is to be presented in legible print. During excavation within the sheet pile protected area, the top of rail elevations shall be checked every hour. Additional readings may be required by the MBTA or Railroad Company(s).
5. Stations shall be spaced at 15-1/2 foot intervals. The number of distractions required will be determined by the length of the excavation parallel to the tracks. There will be four additional stations on each end of the pile driving/excavation operation along the track. Extra stations may be required by the MBTA or Railroad Company.
6. Elevation readings must show the date, time, weather conditions and temperature. Each reading must also provide the following information: track number, compass direction, station number, base elevation (with date), static elevation, change in elevation (recorded in hundredths and in inches), dynamic reading and total deflection in inches. See sample sheet attached.
7. Station "0" will be located at the centerline of the project with Stations 1, 2, 3, etc., being to the right and Stations -1, -2, -3, etc., being to the left when

standing on the near track and looking at the work. In multiple track areas the stations as determined herein are to be carried across each track located within any part of the zone of influence. See Plate I.

8. At each monitoring station a dynamic load measurement shall be taken. The dynamic load measurement device shall consist of a wooden stake placed firmly in the ballast and in initially in contact with the bottom of the rail. The loaded measurement is the resultant gap between the bottom of the rail and the top of the stake caused by the deflection of the rail under the load of a passing train. Based on field observations of the excavation, and at the option of the MBTA or railroad company(s), this requirement may be reduced.
9. Elevation readings taken from the top of rail for static measurement and the dynamic reading shall be combined and the sum compared to the adjusted baseline. This reading will demonstrate the difference in elevation caused by the excavation.
10. The MBTA requires that the track be maintained at all times within established criteria for the specific track classification. At the completion of the project the requirement for tamping and realigning the tracks, caused by the settlement from the construction activity, remains with the Contractor for the duration as specified by the MBTA in their initial review of the Construction Drawings. This tamping and track realignment will be performed by the MBTA or railroad company(s) at the sole expense of the Contractor.



**MASSACHUSETTS BAY
TRANSPORTATION
AUTHORITY**

RAILROAD OPERATIONS DIRECTORATE

IX

TEMPORARY PROTECTION SHIELDS FOR DEMOLITION AND
CONSTRUCTION

The Railroad Company(s) will determine when and where protection shields are required. The designated construction of temporary protection shields must adhere to the following specifications:

1. The construction of temporary protection shields shall be designed to prevent any dust, debris, concrete, formwork, paint, or tools from falling on MBTA Railroad Property below.
2. The temporary protection shields shall be erected prior to the start of work. The Railroad Company(s) will determine whether or not sufficient protection has been provided to perform the work over any particular area.
3. The temporary protection shields shall remain in place until all work over the railroad has been completed and shall be removed only when ordered by the Railroad Company(s).
4. To minimize the inconvenience to the users of any properties below and adjacent to the project, the Contractor shall be required to complete the actual erection and removal of the temporary shields within time limits acceptable to the Railroad Company(s).
5. The erected temporary protection shields shall not infringe on any existing minimum vertical clearance.
6. The Contractor shall be required to obtain the approval of the Railroad Company(s) before commencing any work beneath the shield. In certain areas, depending on the nature of the work, the Railroad Company(s) may require a specific method of protection.
7. The horizontal shield shall be designed to carry a live load of 100 pounds per square foot and a single concentrated load of 2,000 pounds located to produce maximum stress. The vertical shield shall be designed to carry a wide load of 30 pounds per square foot.
8. Prior to the start of construction, the Contractor shall be required to submit the details of the temporary protection shield to the Railroad Company(s), who will review and approve the details only as to the methods of erection and as to whether or not the proposed installation will provide the level of protection required at the various locations. It is the Contractor's responsibility to design these protections so that they are in conformance with all existing laws, regulations and specifications that govern this type of work. Shield plans must include a material list and shall be designed by a Registered Professional Engineer. The Drawings and calculations must bear their seal when they are submitted to the Railroad Company(s).
9. If during the actual construction, the Railroad Company(s) deems that the shield is not providing the desired level of protection or that the Contractor has failed to properly maintain the shield, all work at the

affected location shall cease until corrective measures acceptable to the Railroad Company(s) are instituted.

10. All temporary shields shall be constructed using new material.

**Massachusetts Bay Transportation Authority
Safety Policy/Procedure**

Subject Trench Excavation	Original Issue Date February 13, 2009	Safety Policy/Procedure #5.09
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I. PURPOSE:

The Authority is committed to reducing injuries and losses resulting from accidents and incidents associated with trench excavation. To assist in this endeavor, "Trench Permits" will be issued by the Safety Department. 520 CMR 14.00 as promulgated by the Department of Public Safety (DPS) in conjunction with the Division of Occupational Safety (DOS) pursuant to authority granted by M.G.L. c. 82A § 1. The purpose of 520 CMR 14.00: Excavation and Trench Safety is to establish reasonable standards to protect the safety of the citizens of the Commonwealth from the hazards inherent in trenches, and to provide for penalties for individuals who violate any provision of this regulation.

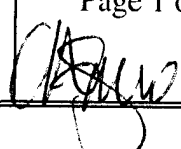
(1) Applicability Provision:

- (a) 520 CMR 14.00 shall apply to any excavator.
- (b) This regulation shall not be construed or enforced in a manner that directly, substantially, or specifically regulates the occupation, safety or health of any employee engaged in employment covered by the Federal Occupational Safety and Health Act (OSHA).
- (c) This regulation shall be read in conjunction with, and shall not supersede, be construed, or be enforced in a manner that contradicts 780 CMR, the Massachusetts State Building Code.

Furthermore, this policy outlines all of the relevant permitting requirements necessary to obtain a "Trench Permit" at the Authority.

II. SCOPE:

This policy/procedure applies to all work on MBTA property by Authority employees and contractors that involve the use of the excavation of a trench.

Issued by Director of Safety	Date of Last Revision	Supersedes N/A	Page 1 of 10 
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**Massachusetts Bay Transportation Authority
Safety Policy/Procedure**

Subject Trench Excavation	Original Issue Date February 13, 2009	Safety Policy/Procedure #5.09
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III. DEFINITIONS AND ABBREVIATIONS:

Competent Person: A person or persons who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to people, and who has authorization to take prompt corrective measures to eliminate them. A competent person must be able to demonstrate that he or she has been trained in and is knowledgeable about: soil analysis, the use of protections for the General Public and the requirements of this regulation.

Emergency: An unforeseen condition in which the safety of the public is in imminent danger because of a threat to life or health or where immediate correction is required to maintain or restore essential public utility service.

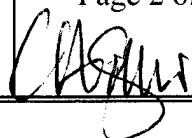
Excavator: Any entity including, but not limited to; a person, partnership, joint venture, trust, corporation, association, public utility, company or state or local government body, or public agency which performs excavation operations, including the excavation of trenches

General Public: All natural persons not engaged in the creation of a trench.

Permitting Authority: A city, town, or public agency required to administer the provisions of 520 C.M.R. 14.03: Permitting Requirements.

Permit Holder: The excavator who is responsible for acquiring a permit from the Permitting Authority.

Public Agency: A department, agency, board, commission, authority, or other instrumentality of the Commonwealth, or political subdivision of the Commonwealth, or two or more subdivisions thereof.

Issued by Director of Safety	Date of Last Revision	Supersedes N/A	Page 2 of 10 
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**Massachusetts Bay Transportation Authority
Safety Policy/Procedure**

Subject Trench Excavation	Original Issue Date February 13, 2009	Safety Policy/Procedure #5.09
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Serious Injury - A personal injury that results in death, dismemberment, significant disfigurement, permanent loss of the use of a body organ, member, function, or system, a compound fracture, or other significant injury that requires immediate admission and overnight hospitalization, and observation by a licensed physician.

Trench: An excavation which is narrow in relation to its length, made below the surface ground in excess of 3 feet below grade, and the depth of which is, in general, greater than the width, but the width of the trench, as measured at the bottom, is no greater than 15 feet.

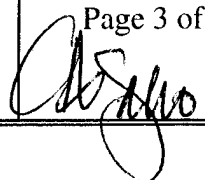
Trench Permit: Required for work that involves the digging of a trench.

Unattended Trench: A trench that neither the permit holder, excavator, nor any of the people who work in or at the trench are present.

IV. RESPONSIBILITIES

A Authority Resident Engineers, Superintendents, Supervisors and Managers from the following departments; Design & Construction, SMI, Operations Support, Real Estate (TRA) and Commuter Rail (MBCR).

- Responsible for implementation/adherence to this policy.
- Will issue Trench Permits application.
- Designate competent personnel to inspect trenches

Issued by Director of Safety	Date of Last Revision	Supersedes N/A	Page 3 of 10 
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**Massachusetts Bay Transportation Authority
Safety Policy/Procedure**

Subject Trench Excavation	Original Issue Date February 13, 2009	Safety Policy/Procedure #5.09
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- Ensure all personnel are properly trained.
- Ensure the task/work activities are appropriate and meet the guidelines for a Trench Permit.
- Ensure the physical environment is free from debris and other hazards.

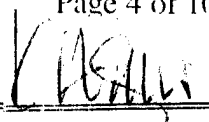
B. Safety Department

- Supplies the Trench Permit forms designated to Authority personnel.
- Provides training on any aspect of this Policy.
- Conducts audits of the Trench permitting procedures.
- Responsible for issuing, tracking and filing of Trench Permits.

V. PROCEDURES:

A. Issuance of Trench Permits

1. Once a supervisor/foreperson/Resident Engineer is alerted that a Trench Permit will be required in the course of a project or work activity, he/she must seek a permit from the next level of management. The application will be sent to the Safety Department and a permit number will be issued. The Safety Department will work with the supervisor to complete the permit. After the work location is cleared of any debris and/or hazards, and the trench is dug, the permit will then be posted in the work area and at the project office if applicable before work commences.
2. The Competent person will fill out the permit application and send it to the Deputy Director / or designee of the Safety Department at 21 Arlington Avenue, Charlestown, MA Fax number 617 222-5127, or TRENCHPOLICY@mbta.com. The Safety Department will then send (e-mail) copies of the completed permit form to the DPS, field staff, appropriate manager and post at the project office.

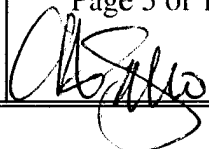
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manager and post at the project office.

3. Contents of Permit Applications. All permit applications must contain the following information:
 - (a) Dig safe number (see sample permit);
 - (b) Name and contact information of permit holder;
 - (c) Name and contact information of the excavator;
 - (d) Name of the competent person(s)
 - (e) Name of person(s) performing the excavation of the trench;
 - (f) Massachusetts Hoisting License number, license grade and expiration date of the person(s) performing the excavation of the trench;
 - (g) Permit expiration date (if applicable);
 - (h) Specific location of the trench;
 - (i) Name and contact information of insurer;
 - (j) All permit applications shall also include the following statements pursuant to M.G.L.c.82A, §3 (3) and (5) (i), (ii):
4. “Persons engaging in any trenching operation shall familiarize themselves with the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 *et. seq.*, entitled Subpart P - Excavations.”². “By applying for, accepting and signing this permit, the applicant attests to the following: (i) that he/she has read and understood the regulations promulgated by the Department of Public Safety with regard to trench safety; (ii) that he/she has read and understood the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 *et. seq.*, entitled Subpart P “Excavations”.
5. Posting - All Permits issued pursuant to this regulation shall be posted in plain view on the site of the trench. All permits shall be made available to

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Occupational Safety, any inspector of the Department of Public Safety, or
any other lawfully authorized authority.

B. Establishment of Trench Excavation Inspection

The Inspector (competent person) shall:

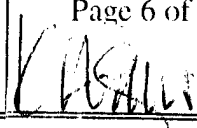
1. Ensure the physical environment is appropriate for a trench excavation.
2. Post a copy of the permit prominently at the work site.
3. Be knowledgeable about emergency response procedures, and be accessible to a telephone or radio in the case of emergency.
4. Ensure that the proper barricade is installed around the trench work site.
5. Sign the Trench Permit and forward it to the supervisor/manager for filing.

C. Competent Person Standard

The "competent person" is a performance based standard and the individual must have the specific knowledge discussed above; however, there is no required number of hours of training or certificates to prove such knowledge. Therefore, a permitting authority is not able to make an assessment about the competent person listed on the permit application, and will have to trust that the competent person listed on the application by the applicant meets the definition.

D. Protection of Unattended Trench

- Post an attendant (such as a police detail, flagperson, etc)
- Surround excavation with minimum 6' high fence
- Cover with minimum ¾" thick steel plates
- Backfill the trench before leaving.

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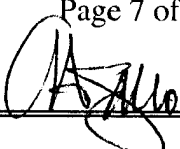
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**CONDITIONS AND REQUIREMENTS
PURSUANT TO G.L.C.82A AND 520 CMR 7.00 ET SEQ. (AS AMENDED)**

By signing the application, the applicant understands, and agrees to comply with the following:

- i. No trench may be excavated unless the requirements of Sections 40 through 40D of Chapter 82, and any accompanying regulations, have been met, and this permit is invalid unless and until said requirements have been complied with by the excavator applying for the permit, including, but not limited to, the establishment of a valid excavation number with the underground plant damage prevention system as said system is defined in Section 76D of Chapter 164 (DIG SAFE);
- ii. Trenches may pose a significant health and safety hazard. Pursuant to Section 1 of Chapter 82 of the General Laws, an excavator shall not leave any open trench unattended without first making every reasonable effort to eliminate any recognized safety hazard that may exist as a result of leaving said open trench unattended. Excavators should consult regulations promulgated by the Department of Public Safety in order to familiarize themselves with the recognized safety hazards associated with excavations and open trenches, and the procedures required or recommended by said department in order to make every reasonable effort to eliminate said safety hazards which may include covering, barricading or otherwise protecting open trenches from accidental entry.
- iii. Persons engaging in any trenching operation shall familiarize themselves with the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 et. seq., entitled Subpart P "Excavations."
- iv. Excavators engaging in any trenching operation who use hoisting or other mechanical equipment subject to Chapter 146 shall only employ individuals licensed to operate said equipment by the Department of Public Safety pursuant to said chapter, and this permit must be presented to said licensed operator before any excavation is commenced;

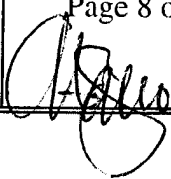
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- v. By applying for, accepting and signing this permit, the applicant hereby attests to the following:
1. that they have read and understands the regulations promulgated by the Department of Public Safety with regard to construction related excavations and trench safety;
 2. that he/she has read and understands the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 et.seq, entitled Subpart P "Excavations" as well as any other excavation requirements established by this municipality; and
 3. that he/she is aware of and has, with regard to the proposed trench excavation on private property excavation of a city or town public way that forms the basis of the permit application, complied with the requirements of Sections 40-40D of Chapter 82A.
- vi. This permit shall be posted in plain view on the site of the trench.

For additional information please visit the Department of Public Safety's website at www.mass.gov/dps

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APPLICATION FOR A PERMIT FOR THE EXCAVATION OF TRENCHES

Location of Excavation:

Name of Location: _____		
Street Address: _____		
City: _____	State: <u>MA</u>	Zip Code: _____

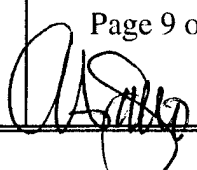
Purpose of Excavation: _____ Size of Trench: _____
Type of Barricading: _____ Type of Shoring: _____
Excavator: _____ Excavator Contact: _____
Excavator Contact Phone: _____
Person(s) Performing Excavation: _____
MA Hoisting License No.: _____ License Grade: _____ Exp. Date: _____
Name of the Competent Person: _____
Anticipated Date to Begin the Trench Operation: _____
Anticipated Date to Conclude the Trench Operation: _____

Departmental Approval Review:

Must be signed by a Resident Engineer, Superintendent, Supervisor or Manager from the following Departments:

Operations: _____
Design and Construction: _____
SMI: _____
Operations Support: _____
Real Estate (TRA): _____
Commuter Rail (MBCR): _____
Applicant: _____ MBTA Contract No.: _____
(if applicable)

Signature of Permitting Authority Representative: _____
Date of Application Approval: _____ Expiration Date: _____

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PERMIT FOR THE EXCAVATION OF TRENCHES

Public Agency: Massachusetts Bay Transit Authority (MBTA)
Name of Permitting Authority: Safety Department – MBTA
Location of Excavation as Indicated on the Application Filed with the Permitting Authority:

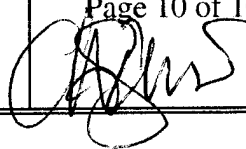
Name of Location: _____		
Street Address: _____		
City: _____	State: <u>MA</u>	Zip Code: _____

Name of the Excavator: _____
Name of the Competent Person: _____
Anticipated Date to Begin the Trench Operation: _____
Anticipated Date to Conclude the Trench Operation: _____
Applicant: _____ MBTA Contract No.: _____
Signature of Approval: _____ Date of Approval: _____
Expiration Date: _____

Pursuant to M.G.L.c.82A, §3 (3) and (5) (i), (ii):

“Persons engaging in any trenching operation shall familiarize themselves with the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 et. seq., entitled Subpart P - Excavations.”². “By applying for, accepting and signing this permit, the applicant attests to the following: (i) that he has read and understood the regulations promulgated by the Department of Public Safety with regard to trench safety; (ii) that he has read and understood the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 et.seq., entitled Subpart P “Excavations”.

Posting - All Permits issued pursuant to this regulation shall be posted in plain view on the site of the trench. All permits shall be made available to the permitting authority, any investigator from the Division of Occupational Safety, any inspector of the Department of Public Safety, or any other lawfully authorized authority.

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