INVITATION FOR BIDS

(IFB #17-04)

MEDFORD STREET AT PEARL STREET SEWER REPLACEMENT

Bid Opening: 11:00am August 17th, 2016

CITY OF SOMERVILLE, MASSACHUSETTS

Joseph A. Curtatone, Mayor

Purchasing Department
Angela M. Allen, Purchasing Director

Michael Richards, Procurement Analyst
City of Somerville
93 Highland Avenue
Somerville, MA 02143
PH: 617-625-6600 x3403

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PART 1 SECTION 00020:
CITY OF SOMERVILLE, MASSACHUSETTS
INVITATION TO BID
MEDFORD STREET AT PEARL STREET SEWER REPLACEMENT
Bid No. 17-04

Enclosed you will find an invitation to bid for:
MEDFORD STREET AT PEARL STREET SEWER REPLACEMENT The project site is located at approximately 343 Medford Street, Somerville, MA 02145.

Plans and specifications will be available from 8:30 AM to 4:30 PM, Monday through Wednesday, 8:30 AM to 7:30 PM on Thursday, and 8:30 AM to 12:00 Noon, Fridays, at the Purchasing Department, 1st Floor, City Hall, 93 Highland Avenue, Somerville, MA 02143 beginning on **Wednesday, July 20th, 2016**. The bid specifications, the technical specifications and drawing are included as part of this bid package. The Purchasing Department may furnish the bid documents in print form on 8.5"x11" paper upon request.

When submitting a bid, please identify the bid item and number clearly. All bids must be sealed and delivered to Purchasing Department, City of Somerville, 93 Highland Ave., Somerville, MA 02143, **no later than 11:00AM, on Wednesday, August 17th, 2016.** Please mark the outside of all bid envelopes with the following:
"Bid #17-04 Medford Street Sewer Replacement".

BIDS SUBMITTED MUST BE AN ORIGINAL.
The completion of the following forms is necessary for consideration of a potential contract award. When submitting bid documents, please retain the order of documents as provided below:

1) **Form for General Bid**
2) **Somerville Living Wage Form**
3) **Acknowledgement of Notice to Bidders**
4) **Quality Requirements Form**
5) **Certificate of Non-Collusion & Tax Compliance**
6) **Certificate of Signature Authority**
7) **OSHA Training Compliance Form**
8) **Signature Form complete when submitting your bid.**
9) **Reference Form**
10) **5% Bid Deposit**
11) **100% Performance and Payment Bond (to be submitted with executed contract)**
12) **Wages, Statement of Compliance Form**

NOTE: **If Vendor is incorporated, an updated "CERTIFICATE OF GOOD STANDING" from the Commonwealth of Massachusetts will be needed for the awarded vendor only.**

CITY HALL IS OPEN FROM 8:30 A.M UNTIL 4:30 P.M. MONDAY THROUGH WEDNESDAY, 8:30 A.M. UNTIL 7:30 P.M. ON THURSDAYS, AND 8:30 A.M. UNTIL 12:30 P.M. ON FRIDAYS.

Please review and return with your sealed bids as sent. Also, ensure that all forms are completed and that your bid response is submitted as requested.
Your cooperation is greatly appreciated.

PART 1, SECTION 2:

INSTRUCTIONS TO BIDDERS

(Chapter c. 39, §39M – Construction- Competitive Sealed Bids)

1. **NAME OF PROJECT**

MEDFORD STREET AT PEARL STREET SEWER REPLACEMENT

2. **AWARDING AUTHORITY**
The City of Somerville (City), acting by and through the Purchasing Department, invites sealed bids for the Sewer at Medford Street at Pearl Street, in accordance with contract documents.

DPW Contact:
Charles Quigley, Director of Engineering
DPW – Engineering
1 Franey Road
Somerville, MA 02145
Phone: (617) 625-6600 x5410

3. ENGINEER/DESIGN PROFESSIONAL:

Kleinfelder
215 First Street
Suite 320
Cambridge, MA 02142
Contact: Gus O'Leary
GOLeary@kleinfelder.com

4. **LOCATION OF PROJECT**

The project site is located at approximately 343 Medford Street, Somerville, MA 02145.

5. **BRIEF DESCRIPTION OF WORK MORE PARTICULARLY DESCRIBED IN THE PLANS AND SPECIFICATIONS INCLUDED AS PART OF THIS BID PACKAGE.**

Medford Street at Pearl Street Sewer Replacement

The Medford Street at Pearl Street Sewer Replacement work consists of replacement of the existing severely distressed 28" brick sewer with a new 24" PVC sewer, along with demolition

and replacement of the associated brick manholes. Work under this Contract shall include, but not be limited to:

1. Coordination with public and private utilities for the protection and support of their facilities as may be required.
2. Coordination with Eversource Electric and support for relocation of the electrical service at Sta. 1+13.
3. Installation of PVC sewer with related manholes
4. Removal and reconnection of existing services which connect the Work of this Contract.
5. Demolition of existing structures and pipes.
6. Grout sealing of existing pipe penetrations through the storm drain.
7. Disposal of excess geotechnically unsuitable excavated material.
8. Vibration monitoring and installation of structure, ground, and utility monitoring points.
9. Reuse geotechnically suitable excavated material on site as backfill and dispose of excess material from excavation not required for fill or backfill as specified, and to the satisfaction of the Owner.
10. Trench pavement restoration.
11. Replacement of disturbed pavement markings.

Contractor will be responsible for providing as-built drawings at final completion. The City will not assume maintenance of the sewer until substantial completion and a site walk-through/review meeting with the Somerville Department of Public Works.

6. ESTIMATED CONSTRUCTION COST OF THE PROJECT

The estimated cost for the project is $ 200,000.00

7. PROJECT SCHEDULE:

Estimated Construction Start: September 23rd, 2016

Date of Substantial Completion: November 18th, 2016

Date of Final Completion: May 12th, 2017
100% completion of all work.

Bidders are instructed to note the firmness of the dates of: Substantial Completion, and Final Completion. For the purpose of meeting these deadlines, the City may be prepared to authorize extended work hours beyond those prescribed by City ordinance, to include work on Sundays with the prior permission of the City.

Contractor submission of all paperwork required for the Construction Contract, including but not limited to insurance certificates, performance and payment bonds, a certificate of good standing from the Secretary of Corporations, and signature pages shall be submitted to the Purchasing Director no later than 5 working days from award of the contract.

The successful bidder shall be required to submit a preliminary construction schedule within 10 days of the established date of award of the Contract and a more detailed Gantt-type construction schedule within 15 days of the established award of the contract, which shows the dates of substantial and final completion.

As the work is scheduled to start on September 23rd, 2016, the City is requesting that the Contractor be mobilized as soon as possible after the contract is awarded and any materials should be ordered as soon as possible, after contract execution, to prevent delays.

8. GOVERNING LAW

Massachusetts General Laws, c. 30, §39M.

9. SALES TAX EXEMPTION

Materials, equipment, and supplies for this project are exempt from sales tax in accordance with M.G.L. Chapter 64H, Section 6 (d). The city will furnish the successful bidder with its sales tax exemption number.

10. PERMIT FEES (Contractor responsible obtaining permits/City of Somerville permit fees waived)

DPW permits to obstruct or excavate the public streets and/or sidewalks; ISD building code permits; and Traffic and Parking permits; are waived by the City of Somerville. However, license fees are not waived by the City of Somerville. The Contractor shall pay all license fees (e.g., drain layer's license fee). The City of Somerville Traffic and Parking Department must be contacted directly for all required permits.

If water usage is required in the commitment of this project, the Contractor needs to contact the DPW Water Dept., and make arrangements for a water meter. There will be a charge for the water meter and the water usage.

The Contractor is responsible for obtaining Eversource work orders and for all costs and fees associated with Eversource.
Permits to excavate the public way cannot be issued until the applicant has notified the appropriate utility companies, as required by Massachusetts General Laws, Chapter 370 of the Acts of 1963. The applicant must either: 1) obtain written receipts from the affected utilities, and provide copies of same to the owner; or 2) utilize the Dig-Safe System for the required notifications, and also submit written notifications for those utilities not participating in the Dig-Safe System. Written notifications must state that utility companies have been notified and the contractor cleared to begin work.

The following utility companies must be notified in writing:

M.B.T.A. Engineering and Maintenance Division 617-722-5454
Attn: Mr. William Bregoli, Chief Engineer
500 Arborway
Jamaica Plain, MA 02130

M.W.R.A. Sewer Division 617-242-6000
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129

M.W.R.A. Water Division 617-242-6000
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129

The following utility companies must be notified in writing or through Dig-Safe;

Algonquin Gas Transmission Corp. 617-254-4050
Attn: Mr. James Grasso
Manager of Land and Public Relations
1284 Soldiers Field Road
Brighton, MA 02135

Verizon 781-290-5154
Attn: Mr. Jim Warren
460 Totten Pond Road
Waltham, MA 02154

Boston Edison 617-541-5730
Attn: Mr. William Lemos
Right of Way
1165 Massachusetts Avenue
Dorchester, MA 02125

Boston Gas Company 617-323-9210
Attn: Mr. Dennis Peri
201 Rivermoor Street
West Roxbury, MA 02132

N-Star Electric 617-497-1236, x4195
Attn: Mr. Wendell Berthelson
46 Blackstone Street
Somerville, MA 02139

N-Star Steam 617-225-4568
Attn: Mr. Thomas Connelly
Supervisor of Maintenance
265 First Street
Somerville, MA 02142

N-Star Gas 617-369-5591
Attn: Mr. Steve Richmond
303 Third Street
Somerville, MA 02142

A T & T Broadband 981-658-0400, x2210
Attn: Mr. Rich Ferrucci
760 Main Street
Malden, MA 01887

Somerville Public Works Department 617-625-6600, x5200
One Franey Road
Somerville, MA 02145

Somerville Fire Department 617-625-6600, x8100
266 Broadway
Somerville, MA 02143

Dig-Safe 1-800-322-4844

The contractor shall have all utilities marked out along the course of this work by such means as the Engineer shall approve and shall preserve such marked locations until the work has progressed to the point where the encountered utility is fully exposed and protected as required. It shall be the contractor's responsibility to notify utilities at least 48 hours prior to the start of any excavation.

The contractor is responsible for contacting any other utilities that are not listed herein.

11. MINIMUM BID CRITERIA

- All bidders must have been conducting sewer construction in urban areas for a minimum of five (5) years.

12. QUESTIONS AND INFORMATION

All questions regarding the project and this Invitation to Bid should be in writing, submitted to Michael Richards, Procurement Analyst, Purchasing Department, Somerville City Hall, First Floor, 93 Highland Avenue, Somerville, Massachusetts, 02143. Questions may be submitted either by mail or email to mrichards@somervillema.gov. Questions must be submitted in writing **by 12:00 pm, Wednesday April 6th, 2016;** they will be answered in writing (via addendum) to all holders of the bid proposals. Bidders must submit e-mail address (preferred) or a fax number with their inquiries. If any

bidders contact any other person or department outside of Purchasing with inquiries, they may be disqualified from the bidding process.

Key Dates

Deadline for Questions	12:00 PM	Wednesday August 3rd, 2016
Proposals Due and Bids Opened	11:00 AM	Wednesday August 17th, 2016
Anticipated Contract Award		Friday August 26th,, 2016
Anticipated Notice to Proceed		Friday September 23rd, 2016

13. BID SUBMISSION TIME AND PLACE OF BID OPENING

Sealed bids (clearly identified as a bid and endorsed with the name and address of the bidder) must be received at the Purchasing Department, First floor, City Hall, 93 Highland Avenue, Somerville, MA, 02143 on or before **11:00 AM on Wednesday August 17th, 2016**, at which time they will be publicly opened and read aloud. In the event City Hall is closed, the deadline shall be 11:30 a.m**.** on the next day City Hall is open for business.

ADDITIONAL REQUIREMENTS: PLEASE READ CAREFULLY, FAILURE TO MEET THESE REQUIREMENTS COULD RESULT IN REJECTION OF A BID.

14. BID SUBMISSION REQUIREMENTS

Bid Signature

A bid must be signed as follows: 1) if the bidder is an individual, by her/him personally; 2) if the bidder is a partnership, by the name of the partnership, followed by the signature of each general partner; and 3) if the bidder is a corporation, by the authorized officer, whose signature must be a person named on the Corporate Secretary's Certificate of Authority.

Changes and Addenda

If any changes are made to this IFB, an addendum will be issued. Addenda will be emailed to all bidders on record as having picked up the IFB. No changes may be made to the bid documents, except as authorized in an addendum from the Purchasing Department.

Modification or Withdrawal of Bids, Mistakes, and Minor Informalities

A bidder may correct, modify, or withdraw a bid by written notice received by the City of Somerville prior to the time and date set for the bid opening. Bid modifications must be submitted in a sealed envelope clearly labeled "Modification No.__" to the address listed in part one of this section. Each modification must be numbered in sequence, and must reference the original IFB.

After the bid opening, a bidder may not change any provision of the bid in a manner prejudicial to the interests of the City or fair competition. Minor informalities will be waived or the bidder will be allowed to correct them. If a mistake and the intended correct bid are clearly evident on the face of the bid document, the mistake will be corrected to reflect the intended correct bid, and the bidder will be notified in writing; the bidder may not withdraw the bid. A bidder may withdraw a bid if a mistake is clearly evident on the face of the bid document, but the intended correct bid is not similarly evident.

Right to Cancel/Reject Bids
The City of Somerville may cancel this IFB, or reject any and all bids, if the City determines that cancellation serves the best interests of the City; or that such rejection of bids is in the public interest.

Bid Prices to Remain Firm
All bid prices submitted in response to this IFB must remain firm for 60 days following the bid opening.

Unbalanced Bids
The City reserves the right to reject unbalanced, front loaded, and conditional bids.

Documents to be Submitted as part of Bid
The following documents must be submitted with the complete signed bid package:

Form for General Bid (Section 00300)

Somerville Living Wage Form (Section 00320)

Acknowledgement of Notice to Bidders (Section 00330)

Quality Requirements Form (Section 00335)

Certificate of Non-Collusion and Tax Compliance (Section 00340)

Certificate of Signature Authority (Section 00350)

Signature Form (Section 00360)

Reference Form (Section 00370)

Bid bond (Section 00380)

Wage Compliance Form (Section 00385)

Schedule of Values. Bidders do NOT need to include a Schedule of Values with their bid package. The successful bidder will be required to submit a refined and detailed schedule of values for review and approval by the design professional prior to signing the construction contract.

5% Statutory Bid Guaranty and 100% Performance and Payment Bonds. All bids shall be accompanied by a bid bond or bank certified check or bank treasurer's check in the amount of 5% of the bid price, which shall become the property of the City of Somerville if the bid is accepted and the bidder neglects or refuses to comply with the terms of the bid, and performance and payment bonds in the amount of 100% of the bid price.

For successful bidder: Certificate of Good Standing: If the bidder is a corporation, a Certificate of Good Standing should accompany the signed contract. Certificate available online at:http://corp.sec.state.ma.us/corp/Certificates/Certificate_Request.asp
or call Tel: (617) 727-9640 for more information.

15. PREVAILING WAGE RATE REQUIREMENTS

The contractor shall pay the Mass. Prevailing Wage Rates. The applicable prevailing wage rates are attached as part of this bid package and will be included as Appendix J in the contract. A signed Compliance Form must be included with the bid package, Form included.

(a) The Contractor shall pay wages at no less than the Mass. Prevailing Wage Rates set forth in Appendix J. Notwithstanding anything to the contrary, the City may, in its sole discretion withhold payment unless the City has in its possession payroll records that are complete, accurate, and current as of the date of said application for payment.

(b) The Contractor shall:
(1) Pay wages at least once a week;
(2) Submit payroll information on a weekly basis in a format approved by the City, numbered in numerical sequence and signed by the Contractor (including forms for weeks when the Contractor is not on the Project Site, in which case there shall be a notation to the effect "no work this payroll period" and a date anticipated for resuming work).

(c) The Contractor shall submit to the City within the first week of construction:
(1) A list of apprenticeship programs with which the Contractor is affiliated;
(2) The number of apprentices that will be employed by the Contractor on the Project;
(3) A list of the Contractor's employee fringe benefits;
(4) A copy of each project schedule, including the anticipated commencement date for each Subcontractor; and
(5) A list of each Subcontractor's suppliers and material men.

(d) The Contractor shall include language similar to the above in all subcontracts.

16. SAMPLE CONSTRUCTION CONTRACT

The successful bidder shall execute with the City of Somerville a Public Works Contract ("Contract") in substantially the same form as the sample contract included in this bid package. In addition to the items submitted with the bid, the contract includes certain other documents which may be executed by the Bidder selected as contractor and which are included as Appendices to the Sample Construction Contract (see Part 2) include:

Appendix F: Certificate of Authority (for corporations if the contract is signed by anyone other than the President, there must be a current Certificate of Vote signed by the corporate clerk or secretary stating who is authorized to sign contracts on the Corporations behalf)

Appendix D: Insurance Certificates– evidencing minimum coverage as follows:
General Liability - $2,000,000 per occurrence, $2,000,000 aggregate
Automobile Liability: $1,000,000 per occurrence, $1,000,000 aggregate
Workman's Compensation: statutory coverage
Certificates must stipulate "City of Somerville" and "Kleinfelder" as a certificate holder and as an additional insured for general liability.

Appendix F: Certificate of Good Standing: Certificate available online at
http://corp.sec.state.ma.us/corp/Certificates/Certificate_Request.asp
or call Tel: (617) 727-9640 for more information.

Appendix H: Statement of Management (for contracts over $100,000.00)

Appendix I: Performance and Payment Bonds for 100% of the contract sum

All paperwork required for the contract shall be completed and delivered to the Purchasing Department no later than five (5) working days after the Award of the Contract.

ITEMS OF SPECIAL CONSIDERATION
The Contractor's attention is specifically drawn to the following items of special consideration relative to this project, most of which are also addressed in the Technical Specifications.

a. The Contractor must order police details, which will be paid by the City.
b. All new Handicapped Accessible ramps must meet the most current state ADA and City of Somerville standards.
c. The Contractor must obtain all street and sidewalk permits as necessary.

19. RESERVATION OF RIGHTS

The City reserves the right to extend the deadline for submission of bids, to waive minor informalities, and to reject any and all bids, if in its sole judgment, the best interests of the City of Somerville would be served by doing so.

20. RULE FOR AWARD

A contract will be awarded to the lowest responsible and eligible bidder. All required bid documents must be provided to be deemed responsible and eligible.

21. MAINTENANCE MANUAL AND AS-BUILT DRAWING REQUIREMENTS

Upon Final Completion of all construction, the contractor shall submit: two copies of an as-built drawing set, with two digital copies of the as-built drawings on compact disc (CD) or thumb drive.

The City will not issue the final check for retainage until the submittal and approval of the as-built drawings.

1) As-Built drawing shall be a complete and accurate record that incorporate any and all changes to the construction plan set issued at the time of contract initiation. As-built drawings shall be clearly marked and annotated and shall include but not be limited to: all field changes, change orders, and supplemental drawing provided by the landscape architect.

2) The Compact Discs shall include an electronic copy of all as-built drawings.

PART 1 SECTION 3

Medford Street at Pearl Street Sewer Replacement

(IFB # 17-04

BID SUBMISSION DOCUMENTS

BIDDERS NAME: _____

This Bid Submission includes the following:

_____ Form for General Bid

_____ Somerville Living Wage Form

_____ Acknowledgement of Notice to Bidders

_____ Quality Requirements

_____ Certificate of Non-Collusion and Tax Compliance

_____Certificate of Signature Authority

_____OSHA Training Compliance Form

_____Signature Form

_____Reference Form

_____5% Statutory Bid Bond or Guaranty

_____Wage Rate Compliance Forms

CITY OF SOMERVILLE, MA
MEDFORD STREET AT PEARL STREET SEWER REPLACEMENT
ITEMIZED BID LIST

Item No.	Description	Estimated Quantity	Extended Total
1060.1	MWRA Dewatering Discharge Permit Fee Ten Thousand dollars and zero cents Dollars ($ 10,000.00) Allowance	1	$10,000.00
1200.1	Temporary Utility Support and Coordination Dollars ($) Lump Sum	1	$
1200.2	Survey Construction Layout, As-Builts Dollars ($) Lump Sum	1	$
1390.1	Internal and External Preconstruction Video Building Inspection Dollars ($) Lump Sum	1	$
1400.1	Quality Control and Testing Five Thousand dollars and zero cents Dollars ($ 5,000.00) Allowance	1	$5,000.00
1505.1	Mobilization Dollars ($) Lump Sum	1	$

1568.1	Sedimentation and Erosion Control Dollars ($) Lump Sum	1	$
1570.1	Traffic and Pedestrian Management Dollars ($) Lump Sum	1	$
1570.2	Remote Control Changeable Message Sign Dollars ($) per Week	12	$
1570.3	Safety Signing for Construction Operations Dollars ($) Lump Sum	1	$
2015.1	Vibration Monitoring Dollars ($) Lump Sum	1	$
2015.2	Building Monitoring Points Dollars ($) each	6	$
2015.3	Ground Surface and Utility Monitoring Points Dollars ($) each	9	$
2051.1	Disposal of Construction Debris as Solid Waste Dollars ($) per TON	5	$

2051.2	Disposal of Bituminous Concrete Dollars ($) per TON	36	$
2051.3	Demolition or Removal of Manhole, Catch Basin, Lamphole Dollars ($) each	2	$
2051.4	Abandon Pipe In Place Dollars ($) per LF	60	$
2051.5	Demolition or Removal of Pipe Dollars ($) per LF	100	$
2080.1	OHM - Soil and Waste Management Dollars ($) Lump Sum	1	$
2095.1	OHM - Disposal of Soil - Daily Cover Unlined Landfill (Class A-1, A-2) Twenty two and 00/100 + _____ = _____ Dollars ($22.00 + =) per TON	55	$
2095.2	OHM - Disposal of Soil - Daily Cover Unlined Landfill (Class B-1) Thirty seven and 00/100 + _____ = _____ Dollars ($37.00 + =) per TON	100	$

2095.3	OHM - Disposal of Soil - Daily Cover Lined Landfill (Class B-2) Forty one and 00/100 + _____ = _____ Dollars ($41.00 + =) per TON	10	$
2095.4	OHM - Disposal of Soil - Non-Hazardous Solid Waste Asphalt Batching In-State (Class B-3) Fifty and 00/100 + _ _____ ____ = _____ Dollars ($50.00 + =) per TON	10	$
2140.1	Treatment of Construction Dewatering _____ Dollars ($) per Day	10	$
2210.1	Control Density Fill for Backfill _____ Dollars ($) per CY	10	$
2210.2	Over Excavation of Unsuitable Soil and Backfill with Suitable Soil _____ Dollars ($) per CY	25	$
2252.1	Type-1 - Manhole - Precast 4-Foot Diameter _____ Dollars ($) each	2	$
2500.1	Hot Mix Asphalt Trench Width (Permanent Trench Patch) _____ Dollars ($) per TON	36	$

2622.1	Pipe - PVC (Gravity) 24-inch Dollars ($) per LF	85	$
2622.6	Reconnect, Repair or Relocate Existing Sanitary Sewer Laterals Dollars ($) per LF	25	$
2760.1	Cleaning of Sanitary Sewers and Storm Drains Dollars ($) Lump Sum	1	$
2760.2	Closed Circuit Television Inspection Dollars ($) Lump Sum	1	$
2760.2	Flow Bypass Dollars ($) Lump Sum	1	$
3300.1	CIP Concrete Pipe Connection 24" Diameter (CIP Field Closure) Dollars ($) each	1	$
3315.1	Sealing around Pipe Penetrations Dollars ($) Lump Sum	1	$

Total Amount of Bid (Basis of Award) (Items 1060.1 though 3315.1,) inclusive:

$ _____

(Amount in figures)

_____

(Amount in words)

SOMERVILLE LIVING WAGE ORDINANCE CERTIFICATION FORM

CITY OF SOMERVILLE CODE OF ORDINANCES SECTION 2-397 et seq[*].

Instructions: This form shall be included in all Invitations for Bids and Requests for Proposals which involve the furnishing of labor, time or effort (with no end product other than reports) by vendors contracting or subcontracting with the City of Somerville, where the contract price meets or exceeds the following dollar threshold: $10,000. If the undersigned is selected, this form will be attached to the contract or subcontract and the certifications made herein shall be incorporated as part of such contract or subcontract. **Complete this form and sign and date where indicated below on page 2.**

Purpose: The purpose of this form is to ensure that such vendors pay a "Living Wage" (defined below) to all covered employees (i.e., all employees except individuals in a city, state or federally funded youth program). In the case of bids, the City will award the contract to the lowest responsive and responsible bidder paying a Living Wage. In the case of RFP's, the City will select the most advantageous proposal from a responsive and responsible offeror paying a Living Wage. In neither case, however, shall the City be under any obligation to select a bid or proposal that exceeds the funds available for the contract.

Definition of "Living Wage": For this contract or subcontract, as of **7/1/2016** "Living Wage" shall be deemed to be an hourly wage of no less than **$12.31** per hour. From time to time, the Living Wage may be upwardly adjusted and amendments, if any, to the contract or subcontract may require the payment of a higher hourly rate if a higher rate is then in effect.

CERTIFICATIONS

1. The undersigned shall pay no less than the Living Wage to all covered employees who directly expend their time on the contract or subcontract with the City of Somerville.

2. The undersigned shall post a notice, (copy enclosed), to be furnished by the contracting City Department, informing covered employees of the protections and obligations provided for in the Somerville Living Wage Ordinance, and that for assistance and information, including copies of the Ordinance, employees should contact the contracting City Department. Such notice shall be posted in each location where services are performed by covered employees, in a conspicuous place where notices to employees are customarily posted.

3. The undersigned shall maintain payrolls for all covered employees and basic records relating hereto and shall preserve them for a period of three years. The records shall contain the name and address of each employee, the number of hours worked, the gross wages, a copy of the social

[*] Copies of the Ordinance are available upon request to the Purchasing Department.

security returns, and evidence of payment thereof and such other data as may be required by the contracting City Department from time to time.

4. The undersigned shall submit payroll records to the City upon request and, if the City receives information of possible noncompliance with the provisions the Somerville Living Wage Ordinance, the undersigned shall permit City representatives to observe work being performed at the work site, to interview employees, and to examine the books and records relating to the payrolls being investigated to determine payment of wages.

5. The undersigned shall not fund wage increases required by the Somerville Living Wage Ordinance by reducing the health insurance benefits of any of its employees.

6. The undersigned agrees that the penalties and relief set forth in the Somerville Living Wage Ordinance shall be in addition to the rights and remedies set forth in the contract and/or subcontract.

CERTIFIED BY:

Signature: _____
(Duly Authorized Representative of Vendor)

Title: _____

Name of Vendor:_____

Date: _____

INSTRUCTIONS: PLEASE POST

NOTICE TO ALL EMPLOYEES REGARDING PAYMENT OF LIVING WAGE

Under the Somerville, Massachusetts' Living Wage Ordinance (Ordinance No. 1999-1), any person or entity who has entered into a contract with the City of Somerville is required to pay its employees who are involved in providing services to the City of Somerville no less than a "Living Wage".

The Living Wage as of **7/1/2016** is **$12.31** per hour. The only employees who are not covered by the Living Wage Ordinance are individuals in a Youth Program. "Youth Program" as defined in the Ordinance, "means any city, state or federally funded program which employs youth, as defined by city, state or federal guidelines, during the summer, or as part of a school to work program, or in any other related seasonal or part-time program."

For assistance and information regarding the protections and obligations provided for in the Living Wage Ordinance and/or a copy of the Living Wage Ordinance, all employees should contact the City of Somerville's Purchasing Department directly.

NOTICE TO BIDDERS
BID #17-04

All bids must be in accordance with terms and conditions set forth herein as stated.

SECTION A. Sealed bids for: **Medford Street at Pearl Street**. The bids will be received at the office of the Purchasing Director, Somerville City Hall, 93 Highland Avenue, Somerville, MA. 02143 no later than **Wednesday, August 17th, 2016 at 11:00 A.M.** at which time and place they will be publicly opened and read.

SECTION B. Forms of price bid, specifications and terms of contract can be obtained at the Purchasing Department office on or after **Wednesday, July 20th, 2016.**

SECTION C. Bid envelopes shall be clearly marked as follows: **"Bid No: 17-04 Bid for Medford Street at Pearl Street".**

SECTION D. If **awarded** vendor is a Corporation, vendor must comply with request for "Certificate of Good Standing". See attached instructions.

SECTION E. **INSURANCE: Awarded Vendor** must comply with insurance requirements as stated in the bid package.

SECTION F. Living Wage - see Somerville Living Wage Form (00320)
Prevailing Wage Rates – and Compliance Form

SECTION G. The requirements in Section **E or F** will be waived if the words "Non-Applicable" **(N/A)** are inserted in the space designated.

SECTION H. The copy of the bid deposited with the City will be accompanied by a bid guarantee in the amount of 5% of the proposed bid amount. A Bid bond, Certified Check, Treasurer's Check, or Cashier's Check made payable to the City must be submitted with each bid. Said bid guarantee will become the property of the City of Somerville if the proposal is accepted and the bidder either neglects or refuses to comply with the terms of the proposal. Bid guarantee will be returned within 30 days to all unsuccessful bidders.

SECTION I. Performance and Payment Bonds in the amount of 100% of the total contract price will be required by the City.

SECTION J. The Purchasing Director reserves the right to accept or reject any or all bids, to waive any minor informalities, if in her sole judgment, the best interest of the City of Somerville would be served by so doing.

SECTION K. The City reserves the right to cancel a contract, if awarded bidder does not respond to all necessary documents and required signature forms within ten (10) working days of receipt of contract.

SECTION L. The Vendor must certify that all employees to be provided have successfully completed at least ten (10) hours of OSHA approved training in Construction Safety and Health.

Signature: _____

Company: _____

By: _____ Title: _____

Date: _____ Tel. No: _____ Fax: _____

Applicable to Corporations:

I hereby attest that the signatory to this bid has the authority to sign and submit bids for the Corporation.

ATTEST: _____
Secretary

QUALITY REQUIREMENTS FORM

Please respond to the following questions. A negative response to any of the first two questions will automatically disqualify the Bidder. A negative response to the third question about SOMWBA will not disqualify the Bidder.

	Yes	No
Has the contractor been established in Sewer Construction for at least 5 years?		
Can the contractor certify that all employees to be provided, have successfully completed at least 10 hours of OSHA approved training in Construction Safety and Health?		
Optional: Vendor: Are you a State Office for Minority and Women Owned Business Assistance (SOMWBA) certified minority- or woman-owned business?		

Non-Collusion Form and Tax Compliance Certification

Instructions: Complete each part of this two-part form and sign and date where indicated below.

A. NON-COLLUSION FORM

I, the undersigned, hereby certify under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person.

As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

Signature: _____
(Individual Submitted Bid or Proposal)
Duly Authorized

Name of Business or Entity:_____

Date: _____

B. TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. c. 62C, §49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support, as well as paid all contributions and payments in lieu of contributions pursuant to MGL 151A, §19A(b).

Signature: _____
(Duly Authorized Representative of Vendor)

Name of Business or Entity:_____

Social Security Number or Federal Tax ID#:_____

Date: _____

Print

Certificate of Authority
(Corporations Only)

Instructions: Complete this form and sign and date where indicated below.

1. I hereby certify that I, the undersigned, am the duly elected Clerk/Secretary of

_____.
(Insert Full Name of Corporation)

2. I hereby certify that the following individual _____
(Insert the Name of Officer who Signed the Contract and Bonds)

is the duly elected_____ of said Corporation.
(Insert the Title of the Officer in Line 2)

3. I hereby certify that on _____
(Insert Date: Must be *on or before* Date Officer Signed Contract/Bonds)

at a duly authorized meeting of the Board of Directors of said corporation, at which a quorum was present, it was voted that

_____ _____
(Insert Name of Officer from Line 2) **(Insert Title of Officer from Line 2)**

of this corporation be and hereby is authorized to make, enter into, execute, and deliver contracts and bonds in the name and on behalf of said corporation, and affix its Corporate Seal thereto, and such execution of any contract of obligation in this corporation's name and on its behalf, with or without the Corporate Seal, shall be valid and binding upon this corporation; and that the above vote has not been amended or rescinded and remains in full force and effect as of the date set forth below.

4. **ATTEST**:
Signature: _____ ***AFFIX CORPORATE SEAL HERE***
(**Clerk or Secretary)**
Printed Name: _____

Printed Title:_____

Date: _____
(Date Must Be *on or after* Date Officer Signed Contract/Bonds)

Print

Certificate of Authority
(Limited Liability Companies Only)

Instructions: Complete this form and sign and date where indicated below.

1. I, the undersigned, being a member or manager of

_____,
(Complete Name of Limited Liability Company)

a limited liability company (LLC) hereby certify as to the contents of this form for the purpose of contracting with the City of Somerville.

2. The LLC is organized under the laws of the state of: _____.

3. The LLC is managed by **(check one)** a ☐ Manager or by its ☐ Members.

4. I hereby certify that each of the following individual(s) is:
   - a member/manager of the LLC;
   - duly authorized to execute and deliver this contract, agreement, and/or other legally binding documents relating to any contract and/or agreement on behalf of the LLC;
   - duly authorized to do and perform all acts and things necessary or appropriate to carry out the terms of this contract or agreement on behalf of the LLC; and
   - that no resolution, vote, or other document or action is necessary to establish such authority.

Name	Title

5. **Signature**:_____

Printed Name: _____

Printed Title:_____

Date: _____ Print

OSHA GENERAL CONTRACTOR CERTIFICATION FORM

Pursuant to Chapter 306 of the Acts of 2004
An Act Relative to the Health and Safety on Construction Projects

GENERAL CONTRACTOR'S CERTIFICATION – BID FORM

I, the undersigned, hereby certify under penalties of perjury that I, and all subcontractors who are not filed sub-bidders, shall:

> (1) certify 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 a least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

Signature: _____
(Individual Submitting Bid)
Duly Authorized

Name of Business or Entity:_____

Date: _____

RETURN THIS FORM WITH YOUR BID

CITY OF SOMERVILLE

SIGNATURE FORM

NAME OF COMPANY: _____

ADDRESS: _____

TELEPHONE #:_____FAX #: _____

DATE: _____ EMAIL: _____

SIGNATURE OF AUTHORIZED CONTRACTING OFFICIAL:

_____

TITLE: _____

RESIDENCE: _____

IF COMPANY IS A PARTNERSHIP:

FULL NAME AND RESIDENCE OF EACH PARTNER:

_____

_____

IF COMPANY IS A CORPORATION:

THE CORPORATE NAME IS: _____

THE CORPORATION IS ORGANIZED UNDER THE LAWS OF: _____

THE PRESIDENT IS: _____

THE TREASURER IS: _____

THE CLERK/SECRETARY OR ASSISTANT CLERK/SECRETARY WHO WILL EXECUTE THE CONTRACT AND SIGN THE CERTIFICATE OF AUTHORITY IS:

_____

NAME OF CORPORATION THAT WILL APPEAR ON A POTENTIAL CONTRACTUAL AGREEMENT IF DIFFERENT FROM ABOVE:_____.

NAME AND TITLE OF PERSON WHO WILL BE THE PRINCIPAL SIGNATORY ON THE CONTRACT IF OTHER THAN THE PRESIDENT:

NAME:_____TITLE: _____

REFERENCE FORM

Bidder:_____

IFB Title: **IFB# 17-04 Medford Street Sewer Replacement**
Bidder must provide references from three municipalities for similar historic masonry rehabilitation projects completed during the previous five (5) years.

Reference:_____ Contact:_____

Address:_____ Phone:_____

_____ Fax:_____

Description and date(s) of supplies or services provided:_____

_____

_____

Reference:_____ Contact:_____

Address:_____ Phone:_____

_____ Fax:_____

Description and date(s) of supplies or services provided:_____

_____

_____

Reference:_____ Contact:_____

Address:_____ Phone:_____

_____ Fax:_____

Description and date(s) of supplies or services provided:_____

_____

BID BOND OR GUARANTY
PAYMENT BOND

BIDDER TO INSERT HERE

Prevailing Wage Rates
Payroll Submission Forms

CHARLES D. BAKER
Governor

KARYN E. POLITO
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

RONALD L. WALKER, II
Secretary

WILLIAM D MCKINNEY
Director

Awarding Authority: City of Somerville

Contract Number:

City/Town: SOMERVILLE

Description of Work: Removal and replacement of approx. 80 linear feet of brick gravity sewer and two (2) brick manholes

Job Location: Medford Street at Pearl Street, Somerville, MA

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- 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 from the Department of Labor Standards ("DLS") 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 any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person 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 DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- 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. Awarding authorities are required to request these updates 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, 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. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to 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. A sample of a payroll reporting form may be obtained at 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.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- 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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$33.25	$10.41	$10.08	$0.00	$53.74
	08/01/2016	$33.25	$10.91	$10.08	$0.00	$54.24
	12/01/2016	$33.25	$10.91	$10.89	$0.00	$55.05
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$33.32	$10.41	$10.08	$0.00	$53.81
	08/01/2016	$33.32	$10.91	$10.08	$0.00	$54.31
	12/01/2016	$33.32	$10.91	$10.89	$0.00	$55.12
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$33.44	$10.41	$10.08	$0.00	$53.93
	08/01/2016	$33.44	$10.91	$10.08	$0.00	$54.43
	12/01/2016	$33.44	$10.91	$10.89	$0.00	$55.24
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	$88.29	$9.80	$19.23	$0.00	$117.32
AIR TRACK OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.60	$7.45	$13.80	$0.00	$57.85
For apprentice rates see "Apprentice- LABORER"	12/01/2016	$37.60	$7.45	$13.80	$0.00	$58.85
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	12/01/2015	$34.38	$10.40	$5.95	$0.00	$50.73
ASPHALT RAKER *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
For apprentice rates see "Apprentice- LABORER"	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$44.23	$10.00	$15.15	$0.00	$69.38
	12/01/2016	$45.48	$10.00	$15.15	$0.00	$70.63
	06/01/2017	$46.48	$10.00	$15.15	$0.00	$71.63
	12/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$44.23	$10.00	$15.15	$0.00	$69.38
	12/01/2016	$45.48	$10.00	$15.15	$0.00	$70.63
	06/01/2017	$46.48	$10.00	$15.15	$0.00	$71.63
	12/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
For apprentice rates see "Apprentice- LABORER"	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 1*	06/01/2016	$36.60	$7.45	$13.80	$0.00	$57.85
For apprentice rates see "Apprentice- LABORER"	12/01/2016	$37.60	$7.45	$13.80	$0.00	$58.85
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2016	$41.62	$6.97	$16.21	$0.00	$64.80
	01/01/2017	$42.92	$6.97	$16.21	$0.00	$66.10

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$27.05	$6.97	$10.54	$0.00	$44.56
2	65	$27.05	$6.97	$10.54	$0.00	$44.56
3	70	$29.13	$6.97	$11.35	$0.00	$47.45
4	75	$31.22	$6.97	$12.16	$0.00	$50.35
5	80	$33.30	$6.97	$12.97	$0.00	$53.24
6	85	$35.38	$6.97	$13.78	$0.00	$56.13
7	90	$37.46	$6.97	$14.59	$0.00	$59.02
8	95	$39.54	$6.97	$15.40	$0.00	$61.91

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$27.90	$6.97	$10.54	$0.00	$45.41
2	65	$27.90	$6.97	$10.54	$0.00	$45.41
3	70	$30.04	$6.97	$11.35	$0.00	$48.36
4	75	$32.19	$6.97	$12.16	$0.00	$51.32
5	80	$34.34	$6.97	$12.97	$0.00	$54.28
6	85	$36.48	$6.97	$13.78	$0.00	$57.23
7	90	$38.63	$6.97	$14.59	$0.00	$60.19
8	95	$40.77	$6.97	$15.40	$0.00	$63.14

Notes:

Apprentice to Journeyworker Ratio:1:5

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (BOSTON)*	02/01/2016	$49.86	$10.18	$19.14	$0.00	$79.18
	08/01/2016	$50.76	$10.18	$19.22	$0.00	$80.16
	02/01/2017	$51.33	$10.18	$19.22	$0.00	$80.73

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Boston*

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.93	$10.18	$19.14	$0.00	$54.25
2	60	$29.92	$10.18	$19.14	$0.00	$59.24
3	70	$34.90	$10.18	$19.14	$0.00	$64.22
4	80	$39.89	$10.18	$19.14	$0.00	$69.21
5	90	$44.87	$10.18	$19.14	$0.00	$74.19

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.38	$10.18	$19.22	$0.00	$54.78
2	60	$30.46	$10.18	$19.22	$0.00	$59.86
3	70	$35.53	$10.18	$19.22	$0.00	$64.93
4	80	$40.61	$10.18	$19.22	$0.00	$70.01
5	90	$45.68	$10.18	$19.22	$0.00	$75.08

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2016	$36.95	$7.45	$14.00	$0.00	$58.40
	12/01/2016	$37.95	$7.45	$14.00	$0.00	$59.40
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2016	$35.80	$7.45	$14.00	$0.00	$57.25
	12/01/2016	$36.80	$7.45	$14.00	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2016	$35.80	$7.45	$14.00	$0.00	$57.25
	12/01/2016	$36.80	$7.45	$14.00	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 1 (Metro Boston)*	03/01/2016	$43.92	$9.80	$16.82	$0.00	$70.54
	09/01/2016	$45.01	$9.80	$16.82	$0.00	$71.63
	03/01/2017	$46.09	$9.80	$16.82	$0.00	$72.71
	09/01/2017	$47.21	$9.80	$16.82	$0.00	$73.83
	03/01/2018	$48.32	$9.80	$16.82	$0.00	$74.94
	09/01/2018	$49.47	$9.80	$16.82	$0.00	$76.09
	03/01/2019	$50.62	$9.80	$16.82	$0.00	$77.24

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER - Zone 1 Metro Boston*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.96	$9.80	$1.63	$0.00	$33.39
2	60	$26.35	$9.80	$1.63	$0.00	$37.78
3	70	$30.74	$9.80	$11.93	$0.00	$52.47
4	75	$32.94	$9.80	$11.93	$0.00	$54.67
5	80	$35.14	$9.80	$13.56	$0.00	$58.50
6	80	$35.14	$9.80	$13.56	$0.00	$58.50
7	90	$39.53	$9.80	$15.19	$0.00	$64.52
8	90	$39.53	$9.80	$15.19	$0.00	$64.52

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.51	$9.80	$1.63	$0.00	$33.94
2	60	$27.01	$9.80	$1.63	$0.00	$38.44
3	70	$31.51	$9.80	$11.93	$0.00	$53.24
4	75	$33.76	$9.80	$11.93	$0.00	$55.49
5	80	$36.01	$9.80	$13.56	$0.00	$59.37
6	80	$36.01	$9.80	$13.56	$0.00	$59.37
7	90	$40.51	$9.80	$15.19	$0.00	$65.50
8	90	$40.51	$9.80	$15.19	$0.00	$65.50

Notes:

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (BOSTON)*	01/01/2016	$46.44	$10.90	$18.71	$1.30	$77.35

Apprentice - *CEMENT MASONRY/PLASTERING - Eastern Mass (Boston)*

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.22	$10.90	$12.21	$0.00	$46.33
2	60	$27.86	$10.90	$13.71	$1.30	$53.77
3	65	$30.19	$10.90	$14.71	$1.30	$57.10
4	70	$32.51	$10.90	$15.71	$1.30	$60.42
5	75	$34.83	$10.90	$16.71	$1.30	$63.74
6	80	$37.15	$10.90	$17.71	$1.30	$67.06
7	90	$41.80	$10.90	$18.71	$1.30	$72.71

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CHAIN SAW OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$45.23	$10.00	$15.15	$0.00	$70.38
	12/01/2016	$46.48	$10.00	$15.15	$0.00	$71.63
	06/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63
	12/01/2017	$48.48	$10.00	$15.15	$0.00	$73.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$30.40	$10.00	$15.15	$0.00	$55.55
	12/01/2016	$31.27	$10.00	$15.15	$0.00	$56.42
	06/01/2017	$31.96	$10.00	$15.15	$0.00	$57.11
	12/01/2017	$32.65	$10.00	$15.15	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2016	$50.46	$7.85	$16.10	$0.00	$74.41
	01/01/2017	$51.41	$7.85	$16.10	$0.00	$75.36

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.23	$7.85	$0.00	$0.00	$33.08
2	55	$27.75	$7.85	$3.66	$0.00	$39.26
3	60	$30.28	$7.85	$3.99	$0.00	$42.12
4	65	$32.80	$7.85	$4.32	$0.00	$44.97
5	70	$35.32	$7.85	$14.11	$0.00	$57.28
6	75	$37.85	$7.85	$14.44	$0.00	$60.14
7	80	$40.37	$7.85	$14.77	$0.00	$62.99
8	90	$45.41	$7.85	$15.44	$0.00	$68.70

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.71	$7.85	$0.00	$0.00	$33.56
2	55	$28.28	$7.85	$3.66	$0.00	$39.79
3	60	$30.85	$7.85	$3.99	$0.00	$42.69
4	65	$33.42	$7.85	$4.32	$0.00	$45.59
5	70	$35.99	$7.85	$14.11	$0.00	$57.95
6	75	$38.56	$7.85	$14.44	$0.00	$60.85
7	80	$41.13	$7.85	$14.77	$0.00	$63.75
8	90	$46.27	$7.85	$15.44	$0.00	$69.56

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 1*	12/01/2015	$35.50	$7.45	$13.55	$0.00	$56.50
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	12/01/2015	$36.50	$7.45	$13.55	$0.00	$57.50
DEMO: BURNERS *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	12/01/2015	$36.25	$7.45	$13.55	$0.00	$57.25
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	12/01/2015	$36.50	$7.45	$13.55	$0.00	$57.50
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	12/01/2015	$36.25	$7.45	$13.55	$0.00	$57.25
DEMO: WRECKING LABORER *LABORERS - ZONE 1* For apprentice rates see "Apprentice- LABORER"	12/01/2015	$35.50	$7.45	$13.55	$0.00	$56.50
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	$58.86	$9.80	$19.23	$0.00	$87.89
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	$42.04	$9.80	$19.23	$0.00	$71.07
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	$63.06	$9.80	$19.23	$0.00	$92.09
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	$88.23	$9.80	$19.23	$0.00	$117.26
DRAWBRIDGE OPERATOR (Construction) *ELECTRICIANS LOCAL 103* For apprentice rates see "Apprentice- ELECTRICIAN"	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56
ELECTRICIAN *ELECTRICIANS LOCAL 103*	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$18.47	$13.00	$0.55	$0.00	$32.02
2	40	$18.47	$13.00	$0.55	$0.00	$32.02
3	45	$20.78	$13.00	$12.34	$0.00	$46.12
4	45	$20.78	$13.00	$12.34	$0.00	$46.12
5	50	$23.09	$13.00	$12.71	$0.00	$48.80
6	55	$25.39	$13.00	$13.07	$0.00	$51.46
7	60	$27.70	$13.00	$13.44	$0.00	$54.14
8	65	$30.01	$13.00	$13.81	$0.00	$56.82
9	70	$32.32	$13.00	$14.18	$0.00	$59.50
10	75	$34.63	$13.00	$14.55	$0.00	$62.18

Notes: :

App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2016	$54.53	$14.43	$14.96	$0.00	$83.92
	01/01/2017	$55.86	$15.28	$15.71	$0.00	$86.85

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.27	$14.43	$0.00	$0.00	$41.70
2	55	$29.99	$14.43	$14.96	$0.00	$59.38
3	65	$35.44	$14.43	$14.96	$0.00	$64.83
4	70	$38.17	$14.43	$14.96	$0.00	$67.56
5	80	$43.62	$14.43	$14.96	$0.00	$73.01

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.93	$15.28	$0.00	$0.00	$43.21
2	55	$30.72	$15.28	$15.71	$0.00	$61.71
3	65	$36.31	$15.28	$15.71	$0.00	$67.30
4	70	$39.10	$15.28	$15.71	$0.00	$70.09
5	80	$44.69	$15.28	$15.71	$0.00	$75.68

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2016	$38.17	$14.43	$14.96	$0.00	$67.56
	01/01/2017	$39.10	$15.28	$15.71	$0.00	$70.09

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FENCE & GUARD RAIL ERECTOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2016	$41.03	$10.00	$14.90	$0.00	$65.93
	11/01/2016	$41.62	$10.00	$14.90	$0.00	$66.52
	05/01/2017	$42.50	$10.00	$14.90	$0.00	$67.40
	11/01/2017	$43.23	$10.00	$14.90	$0.00	$68.13
	05/01/2018	$43.94	$10.00	$14.90	$0.00	$68.84
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2016	$42.47	$10.00	$14.90	$0.00	$67.37
	11/01/2016	$43.07	$10.00	$14.90	$0.00	$67.97
	05/01/2017	$43.96	$10.00	$14.90	$0.00	$68.86
	11/01/2017	$44.69	$10.00	$14.90	$0.00	$69.59
	05/01/2018	$45.41	$10.00	$14.90	$0.00	$70.31
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2016	$21.88	$10.00	$14.90	$0.00	$46.78
	11/01/2016	$22.23	$10.00	$14.90	$0.00	$47.13
	05/01/2017	$22.76	$10.00	$14.90	$0.00	$47.66
	11/01/2017	$23.18	$10.00	$14.90	$0.00	$48.08
	05/01/2018	$23.61	$10.00	$14.90	$0.00	$48.51
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING*ELECTRICIANS LOCAL 103*	03/01/2016	$34.63	$13.00	$14.55	$0.00	$62.18
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$36.71	$10.00	$15.15	$0.00	$61.86
	12/01/2016	$37.75	$10.00	$15.15	$0.00	$62.90
	06/01/2017	$38.59	$10.00	$15.15	$0.00	$63.74
	12/01/2017	$39.42	$10.00	$15.15	$0.00	$64.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER *LABORERS - ZONE 1*	06/01/2016	$20.50	$7.45	$13.80	$0.00	$41.75
	12/01/2016	$20.50	$7.45	$13.80	$0.00	$41.75
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE I*	03/01/2016	$42.13	$9.80	$17.62	$0.00	$69.55

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.07	$9.80	$1.79	$0.00	$32.66
2	55	$23.17	$9.80	$1.79	$0.00	$34.76
3	60	$25.28	$9.80	$12.25	$0.00	$47.33
4	65	$27.38	$9.80	$12.25	$0.00	$49.43
5	70	$29.49	$9.80	$14.04	$0.00	$53.33
6	75	$31.60	$9.80	$14.04	$0.00	$55.44
7	80	$33.70	$9.80	$15.83	$0.00	$59.33
8	85	$35.81	$9.80	$15.83	$0.00	$61.44

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$44.23	$10.00	$15.15	$0.00	$69.38
	12/01/2016	$45.48	$10.00	$15.15	$0.00	$70.63
	06/01/2017	$46.48	$10.00	$15.15	$0.00	$71.63
	12/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$30.40	$10.00	$15.15	$0.00	$55.55
	12/01/2016	$31.27	$10.00	$15.15	$0.00	$56.42
	06/01/2017	$31.96	$10.00	$15.15	$0.00	$57.11
	12/01/2017	$32.65	$10.00	$15.15	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 1)*	07/01/2016	$45.75	$7.85	$16.10	$0.00	$69.70
	01/01/2017	$46.70	$7.85	$16.10	$0.00	$70.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 35 Zone 1*

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.88	$7.85	$0.00	$0.00	$30.73
2	55	$25.16	$7.85	$3.66	$0.00	$36.67
3	60	$27.45	$7.85	$3.99	$0.00	$39.29
4	65	$29.74	$7.85	$4.32	$0.00	$41.91
5	70	$32.03	$7.85	$14.11	$0.00	$53.99
6	75	$34.31	$7.85	$14.44	$0.00	$56.60
7	80	$36.60	$7.85	$14.77	$0.00	$59.22
8	90	$41.18	$7.85	$15.44	$0.00	$64.47

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.35	$7.85	$0.00	$0.00	$31.20
2	55	$25.69	$7.85	$3.66	$0.00	$37.20
3	60	$28.02	$7.85	$3.99	$0.00	$39.86
4	65	$30.36	$7.85	$4.32	$0.00	$42.53
5	70	$32.69	$7.85	$14.11	$0.00	$54.65
6	75	$35.03	$7.85	$14.44	$0.00	$57.32
7	80	$37.36	$7.85	$14.77	$0.00	$59.98
8	90	$42.03	$7.85	$15.44	$0.00	$65.32

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$44.23	$10.00	$15.15	$0.00	$69.38
	12/01/2016	$45.48	$10.00	$15.15	$0.00	$70.63
	06/01/2017	$46.48	$10.00	$15.15	$0.00	$71.63
	12/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 06/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$24.33	$10.00	$0.00	$0.00	$34.33
2	60	$26.54	$10.00	$15.15	$0.00	$51.69
3	65	$28.75	$10.00	$15.15	$0.00	$53.90
4	70	$30.96	$10.00	$15.15	$0.00	$56.11
5	75	$33.17	$10.00	$15.15	$0.00	$58.32
6	80	$35.38	$10.00	$15.15	$0.00	$60.53
7	85	$37.60	$10.00	$15.15	$0.00	$62.75
8	90	$39.81	$10.00	$15.15	$0.00	$64.96

Effective Date - 12/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$25.01	$10.00	$0.00	$0.00	$35.01
2	60	$27.29	$10.00	$15.15	$0.00	$52.44
3	65	$29.56	$10.00	$15.15	$0.00	$54.71
4	70	$31.84	$10.00	$15.15	$0.00	$56.99
5	75	$34.11	$10.00	$15.15	$0.00	$59.26
6	80	$36.38	$10.00	$15.15	$0.00	$61.53
7	85	$38.66	$10.00	$15.15	$0.00	$63.81
8	90	$40.93	$10.00	$15.15	$0.00	$66.08

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2016	$43.31	$10.70	$21.95	$2.28	$78.24
	08/01/2016	$44.46	$10.70	$21.95	$2.28	$79.39
	02/01/2017	$45.56	$10.70	$21.95	$2.28	$80.49
	08/01/2017	$46.66	$10.70	$21.95	$2.28	$81.59
	02/01/2018	$47.81	$10.70	$21.95	$2.28	$82.74
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	03/01/2016	$46.17	$13.00	$16.39	$0.00	$75.56
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2016	$43.31	$10.70	$21.95	$2.28	$78.24
	08/01/2016	$44.46	$10.70	$21.95	$2.28	$79.39
	02/01/2017	$45.56	$10.70	$21.95	$2.28	$80.49
	08/01/2017	$46.66	$10.70	$21.95	$2.28	$81.59
	02/01/2018	$47.81	$10.70	$21.95	$2.28	$82.74
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	03/01/2016	$49.19	$9.70	$18.14	$0.00	$77.03
	09/01/2016	$50.19	$9.70	$18.14	$0.00	$78.03
	03/01/2017	$51.19	$9.70	$18.14	$0.00	$79.03
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	03/01/2016	$49.19	$9.70	$18.14	$0.00	$77.03
	09/01/2016	$50.19	$9.70	$18.14	$0.00	$78.03
	03/01/2017	$51.19	$9.70	$18.14	$0.00	$79.03
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 1*	06/01/2016	$36.60	$7.45	$13.80	$0.00	$57.85
	12/01/2016	$37.60	$7.45	$13.80	$0.00	$58.85
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2015	$43.81	$11.50	$13.80	$0.00	$69.11
	09/01/2016	$45.81	$11.50	$13.80	$0.00	$71.11
	09/01/2017	$47.81	$11.50	$13.80	$0.00	$73.11
	09/01/2018	$50.06	$11.50	$13.80	$0.00	$75.36
	09/01/2019	$52.56	$11.50	$13.80	$0.00	$77.86

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston*

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.91	$11.50	$10.05	$0.00	$43.46
2	60	$26.29	$11.50	$10.80	$0.00	$48.59
3	70	$30.67	$11.50	$11.55	$0.00	$53.72
4	80	$35.05	$11.50	$12.30	$0.00	$58.85

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.91	$11.50	$10.05	$0.00	$44.46
2	60	$27.49	$11.50	$10.80	$0.00	$49.79
3	70	$32.07	$11.50	$11.55	$0.00	$55.12
4	80	$36.65	$11.50	$12.30	$0.00	$60.45

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (BOSTON AREA)*	03/16/2016	$43.40	$7.80	$20.85	$0.00	$72.05
	09/16/2016	$44.05	$7.80	$20.85	$0.00	$72.70
	03/16/2017	$44.65	$7.80	$20.85	$0.00	$73.30

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Boston*

Effective Date - 03/16/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.04	$7.80	$20.85	$0.00	$54.69
2	70	$30.38	$7.80	$20.85	$0.00	$59.03
3	75	$32.55	$7.80	$20.85	$0.00	$61.20
4	80	$34.72	$7.80	$20.85	$0.00	$63.37
5	85	$36.89	$7.80	$20.85	$0.00	$65.54
6	90	$39.06	$7.80	$20.85	$0.00	$67.71

Effective Date - 09/16/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.43	$7.80	$20.85	$0.00	$55.08
2	70	$30.84	$7.80	$20.85	$0.00	$59.49
3	75	$33.04	$7.80	$20.85	$0.00	$61.69
4	80	$35.24	$7.80	$20.85	$0.00	$63.89
5	85	$37.44	$7.80	$20.85	$0.00	$66.09
6	90	$39.65	$7.80	$20.85	$0.00	$68.30

Notes:

** Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 1*	06/01/2016	$35.85	$7.45	$13.80	$0.00	$57.10
	12/01/2016	$36.85	$7.45	$13.80	$0.00	$58.10

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 1*

Effective Date - 06/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.51	$7.45	$13.80	$0.00	$42.76
2	70	$25.10	$7.45	$13.80	$0.00	$46.35
3	80	$28.68	$7.45	$13.80	$0.00	$49.93
4	90	$32.27	$7.45	$13.80	$0.00	$53.52

Effective Date - 12/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$22.11	$7.45	$13.80	$0.00	$43.36
2	70	$25.80	$7.45	$13.80	$0.00	$47.05
3	80	$29.48	$7.45	$13.80	$0.00	$50.73
4	90	$33.17	$7.45	$13.80	$0.00	$54.42

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 1*	06/01/2016	$35.85	$7.45	$13.80	$0.00	$57.10
	12/01/2016	$36.85	$7.45	$13.80	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 1*	06/01/2016	$35.85	$7.45	$13.80	$0.00	$57.10
	12/01/2016	$36.85	$7.45	$13.80	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 1*	12/01/2015	$35.50	$7.45	$13.55	$0.00	$56.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 1*	06/01/2016	$35.85	$7.45	$13.80	$0.00	$57.10
	12/01/2016	$36.85	$7.45	$13.80	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 1*	06/01/2016	$35.85	$7.45	$13.80	$0.00	$57.10
	12/01/2016	$36.85	$7.45	$13.80	$0.00	$58.10
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2016	$38.08	$10.18	$17.70	$0.00	$65.96
	08/01/2016	$38.78	$10.18	$17.78	$0.00	$66.74
	02/01/2017	$39.24	$10.18	$17.78	$0.00	$67.20

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE & TILE FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.04	$10.18	$17.70	$0.00	$46.92
2	60	$22.85	$10.18	$17.70	$0.00	$50.73
3	70	$26.66	$10.18	$17.70	$0.00	$54.54
4	80	$30.46	$10.18	$17.70	$0.00	$58.34
5	90	$34.27	$10.18	$17.70	$0.00	$62.15

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.39	$10.18	$17.78	$0.00	$47.35
2	60	$23.27	$10.18	$17.78	$0.00	$51.23
3	70	$27.15	$10.18	$17.78	$0.00	$55.11
4	80	$31.02	$10.18	$17.78	$0.00	$58.98
5	90	$34.90	$10.18	$17.78	$0.00	$62.86

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2016	$49.90	$10.18	$19.14	$0.00	$79.22
	08/01/2016	$50.80	$10.18	$19.22	$0.00	$80.20
	02/01/2017	$51.37	$10.18	$19.22	$0.00	$80.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile*

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.95	$10.18	$19.14	$0.00	$54.27
2	60	$29.94	$10.18	$19.14	$0.00	$59.26
3	70	$34.93	$10.18	$19.14	$0.00	$64.25
4	80	$39.92	$10.18	$19.14	$0.00	$69.24
5	90	$44.91	$10.18	$19.14	$0.00	$74.23

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.40	$10.18	$19.22	$0.00	$54.80
2	60	$30.48	$10.18	$19.22	$0.00	$59.88
3	70	$35.56	$10.18	$19.22	$0.00	$64.96
4	80	$40.64	$10.18	$19.22	$0.00	$70.04
5	90	$45.72	$10.18	$19.22	$0.00	$75.12

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 1) *MILLWRIGHTS LOCAL 1121 - Zone 1*	04/01/2015	$37.64	$9.80	$16.21	$0.00	$63.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 1*

Effective Date - 04/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$20.70	$9.80	$4.48	$0.00	$34.98
2	65	$24.47	$9.80	$13.36	$0.00	$47.63
3	75	$28.23	$9.80	$14.18	$0.00	$52.21
4	85	$31.99	$9.80	$14.99	$0.00	$56.78

Notes:

Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$22.41	$10.00	$15.15	$0.00	$47.56
	12/01/2016	$23.06	$10.00	$15.15	$0.00	$48.21
	06/01/2017	$23.57	$10.00	$15.15	$0.00	$48.72
	12/01/2017	$24.09	$10.00	$15.15	$0.00	$49.24
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$26.29	$10.00	$15.15	$0.00	$51.44
	12/01/2016	$27.04	$10.00	$15.15	$0.00	$52.19
	06/01/2017	$27.64	$10.00	$15.15	$0.00	$52.79
	12/01/2017	$28.25	$10.00	$15.15	$0.00	$53.40
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2016	$50.46	$7.85	$16.10	$0.00	$74.41
	01/01/2017	$51.41	$7.85	$16.10	$0.00	$75.36

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.23	$7.85	$0.00	$0.00	$33.08
2	55	$27.75	$7.85	$3.66	$0.00	$39.26
3	60	$30.28	$7.85	$3.99	$0.00	$42.12
4	65	$32.80	$7.85	$4.32	$0.00	$44.97
5	70	$35.32	$7.85	$14.11	$0.00	$57.28
6	75	$37.85	$7.85	$14.44	$0.00	$60.14
7	80	$40.37	$7.85	$14.77	$0.00	$62.99
8	90	$45.41	$7.85	$15.44	$0.00	$68.70

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.71	$7.85	$0.00	$0.00	$33.56
2	55	$28.28	$7.85	$3.66	$0.00	$39.79
3	60	$30.85	$7.85	$3.99	$0.00	$42.69
4	65	$33.42	$7.85	$4.32	$0.00	$45.59
5	70	$35.99	$7.85	$14.11	$0.00	$57.95
6	75	$38.56	$7.85	$14.44	$0.00	$60.85
7	80	$41.13	$7.85	$14.77	$0.00	$63.75
8	90	$46.27	$7.85	$15.44	$0.00	$69.56

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	07/01/2016	$47.15	$7.85	$16.10	$0.00	$71.10
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 1*	01/01/2017	$48.10	$7.85	$16.10	$0.00	$72.05

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - New*

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.58	$7.85	$0.00	$0.00	$31.43
2	55	$25.93	$7.85	$3.66	$0.00	$37.44
3	60	$28.29	$7.85	$3.99	$0.00	$40.13
4	65	$30.65	$7.85	$4.32	$0.00	$42.82
5	70	$33.01	$7.85	$14.11	$0.00	$54.97
6	75	$35.36	$7.85	$14.44	$0.00	$57.65
7	80	$37.72	$7.85	$14.77	$0.00	$60.34
8	90	$42.44	$7.85	$15.44	$0.00	$65.73

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.05	$7.85	$0.00	$0.00	$31.90
2	55	$26.46	$7.85	$3.66	$0.00	$37.97
3	60	$28.86	$7.85	$3.99	$0.00	$40.70
4	65	$31.27	$7.85	$4.32	$0.00	$43.44
5	70	$33.67	$7.85	$14.11	$0.00	$55.63
6	75	$36.08	$7.85	$14.44	$0.00	$58.37
7	80	$38.48	$7.85	$14.77	$0.00	$61.10
8	90	$43.29	$7.85	$15.44	$0.00	$66.58

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2016	$45.21	$7.85	$16.10	$0.00	$69.16
	01/01/2017	$46.16	$7.85	$16.10	$0.00	$70.11

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - Repaint*

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.61	$7.85	$0.00	$0.00	$30.46
2	55	$24.87	$7.85	$3.66	$0.00	$36.38
3	60	$27.13	$7.85	$3.99	$0.00	$38.97
4	65	$29.39	$7.85	$4.32	$0.00	$41.56
5	70	$31.65	$7.85	$14.11	$0.00	$53.61
6	75	$33.91	$7.85	$14.44	$0.00	$56.20
7	80	$36.17	$7.85	$14.77	$0.00	$58.79
8	90	$40.69	$7.85	$15.44	$0.00	$63.98

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.08	$7.85	$0.00	$0.00	$30.93
2	55	$25.39	$7.85	$3.66	$0.00	$36.90
3	60	$27.70	$7.85	$3.99	$0.00	$39.54
4	65	$30.00	$7.85	$4.32	$0.00	$42.17
5	70	$32.31	$7.85	$14.11	$0.00	$54.27
6	75	$34.62	$7.85	$14.44	$0.00	$56.91
7	80	$36.93	$7.85	$14.77	$0.00	$59.55
8	90	$41.54	$7.85	$15.44	$0.00	$64.83

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS) *LABORERS - ZONE 1* For Apprentice rates see "Apprentice- LABORER"	06/01/2016	$35.85	$7.45	$13.80	$0.00	$57.10
	12/01/2016	$36.85	$7.45	$13.80	$0.00	$58.10
PAINTER / TAPER (BRUSH, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 1*	07/01/2016	$45.75	$7.85	$16.10	$0.00	$69.70
	01/01/2017	$46.70	$7.85	$16.10	$0.00	$70.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER - Local 35 Zone 1 - BRUSH NEW*

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.88	$7.85	$0.00	$0.00	$30.73
2	55	$25.16	$7.85	$3.66	$0.00	$36.67
3	60	$27.45	$7.85	$3.99	$0.00	$39.29
4	65	$29.74	$7.85	$4.32	$0.00	$41.91
5	70	$32.03	$7.85	$14.11	$0.00	$53.99
6	75	$34.31	$7.85	$14.44	$0.00	$56.60
7	80	$36.60	$7.85	$14.77	$0.00	$59.22
8	90	$41.18	$7.85	$15.44	$0.00	$64.47

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.35	$7.85	$0.00	$0.00	$31.20
2	55	$25.69	$7.85	$3.66	$0.00	$37.20
3	60	$28.02	$7.85	$3.99	$0.00	$39.86
4	65	$30.36	$7.85	$4.32	$0.00	$42.53
5	70	$32.69	$7.85	$14.11	$0.00	$54.65
6	75	$35.03	$7.85	$14.44	$0.00	$57.32
7	80	$37.36	$7.85	$14.77	$0.00	$59.98
8	90	$42.03	$7.85	$15.44	$0.00	$65.32

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	07/01/2016	$43.81	$7.85	$16.10	$0.00	$67.76
	01/01/2017	$44.76	$7.85	$16.10	$0.00	$68.71

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - BRUSH REPAINT*

Effective Date - 07/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.91	$7.85	$0.00	$0.00	$29.76
2	55	$24.10	$7.85	$3.66	$0.00	$35.61
3	60	$26.29	$7.85	$3.99	$0.00	$38.13
4	65	$28.48	$7.85	$4.32	$0.00	$40.65
5	70	$30.67	$7.85	$14.11	$0.00	$52.63
6	75	$32.86	$7.85	$14.44	$0.00	$55.15
7	80	$35.05	$7.85	$14.77	$0.00	$57.67
8	90	$39.43	$7.85	$15.44	$0.00	$62.72

Effective Date - 01/01/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.38	$7.85	$0.00	$0.00	$30.23
2	55	$24.62	$7.85	$3.66	$0.00	$36.13
3	60	$26.86	$7.85	$3.99	$0.00	$38.70
4	65	$29.09	$7.85	$4.32	$0.00	$41.26
5	70	$31.33	$7.85	$14.11	$0.00	$53.29
6	75	$33.57	$7.85	$14.44	$0.00	$55.86
7	80	$35.81	$7.85	$14.77	$0.00	$58.43
8	90	$40.28	$7.85	$15.44	$0.00	$63.57

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$33.08	$10.41	$10.08	$0.00	$53.57
	08/01/2016	$33.08	$10.91	$10.08	$0.00	$54.07
	12/01/2016	$33.08	$10.91	$10.89	$0.00	$54.88
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	$42.04	$9.80	$19.23	$0.00	$71.07
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2015	$42.04	$9.80	$19.23	$0.00	$71.07

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.02	$9.80	$19.23	$0.00	$50.05
2	60	$25.22	$9.80	$19.23	$0.00	$54.25
3	70	$29.43	$9.80	$19.23	$0.00	$58.46
4	75	$31.53	$9.80	$19.23	$0.00	$60.56
5	80	$33.63	$9.80	$19.23	$0.00	$62.66
6	80	$33.63	$9.80	$19.23	$0.00	$62.66
7	90	$37.84	$9.80	$19.23	$0.00	$66.87
8	90	$37.84	$9.80	$19.23	$0.00	$66.87

Notes:

Apprentice to Journeyworker Ratio:1:3

PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537*	03/01/2016	$49.19	$9.70	$18.14	$0.00	$77.03
	09/01/2016	$50.19	$9.70	$18.14	$0.00	$78.03
	03/01/2017	$51.19	$9.70	$18.14	$0.00	$79.03

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$19.68	$9.70	$7.50	$0.00	$36.88
2	45	$22.14	$9.70	$18.14	$0.00	$49.98
3	60	$29.51	$9.70	$18.14	$0.00	$57.35
4	70	$34.43	$9.70	$18.14	$0.00	$62.27
5	80	$39.35	$9.70	$18.14	$0.00	$67.19

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.08	$9.70	$7.50	$0.00	$37.28
2	45	$22.59	$9.70	$18.14	$0.00	$50.43
3	60	$30.11	$9.70	$18.14	$0.00	$57.95
4	70	$35.13	$9.70	$18.14	$0.00	$62.97
5	80	$40.15	$9.70	$18.14	$0.00	$67.99

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 *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2016	$51.36	$11.07	$15.14	$0.00	$77.57
	09/01/2016	$52.41	$11.07	$15.14	$0.00	$78.62
	03/01/2017	$53.41	$11.07	$15.14	$0.00	$79.62

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$17.98	$11.07	$5.63	$0.00	$34.68
2	40	$20.54	$11.07	$6.37	$0.00	$37.98
3	55	$28.25	$11.07	$8.56	$0.00	$47.88
4	65	$33.38	$11.07	$10.03	$0.00	$54.48
5	75	$38.52	$11.07	$11.48	$0.00	$61.07

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$18.34	$11.07	$5.63	$0.00	$35.04
2	40	$20.96	$11.07	$6.36	$0.00	$38.39
3	55	$28.83	$11.07	$8.55	$0.00	$48.45
4	65	$34.07	$11.07	$10.02	$0.00	$55.16
5	75	$39.31	$11.07	$11.48	$0.00	$61.86

Notes:

** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$57.78 Step5 with lic$64.37

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	03/01/2016	$49.19	$9.70	$18.14	$0.00	$77.03
	09/01/2016	$50.19	$9.70	$18.14	$0.00	$78.03
	03/01/2017	$51.19	$9.70	$18.14	$0.00	$79.03
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER *LABORERS - ZONE 1*	06/01/2016	$36.85	$7.45	$13.80	$0.00	$58.10
	12/01/2016	$37.85	$7.45	$13.80	$0.00	$59.10
For apprentice rates see "Apprentice- LABORER"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$44.23	$10.00	$15.15	$0.00	$69.38
	12/01/2016	$45.48	$10.00	$15.15	$0.00	$70.63
	06/01/2017	$46.48	$10.00	$15.15	$0.00	$71.63
	12/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$44.23	$10.00	$15.15	$0.00	$69.38
	12/01/2016	$45.48	$10.00	$15.15	$0.00	$70.63
	06/01/2017	$46.48	$10.00	$15.15	$0.00	$71.63
	12/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$30.40	$10.00	$15.15	$0.00	$55.55
	12/01/2016	$31.27	$10.00	$15.15	$0.00	$56.42
	06/01/2017	$31.96	$10.00	$15.15	$0.00	$57.11
	12/01/2017	$32.65	$10.00	$15.15	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/10 (Drivers Hired After 4/30/2010)*TEAMSTERS LOCAL 25a*	07/01/2016	$28.03	$8.23	$9.31	$0.00	$45.57
	05/01/2017	$28.18	$8.23	$9.72	$0.00	$46.13
	07/01/2017	$28.18	$8.48	$9.72	$0.00	$46.38
READY-MIX CONCRETE DRIVER *TEAMSTERS LOCAL 25a*	07/01/2016	$31.29	$8.23	$9.31	$0.00	$48.83
	05/01/2017	$31.44	$8.23	$9.72	$0.00	$49.39
	07/01/2017	$31.44	$8.48	$9.72	$0.00	$49.64
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) *CARPENTERS -ZONE 1 (Residential Wood)*	04/01/2011	$37.25	$8.67	$15.51	$0.00	$61.43
RESIDENTIAL WOOD FRAME CARPENTER ** ** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement.*CARPENTERS -ZONE 1 (Residential Wood)*	05/01/2011	$27.49	$6.34	$6.23	$0.00	$40.06

As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.

Apprentice - *CARPENTER (Residential Wood Frame) - Zone 1*

Effective Date - 05/01/2011

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$16.49	$6.34	$0.00	$0.00	$22.83
2	60	$16.49	$6.34	$6.23	$0.00	$29.06
3	65	$17.87	$6.34	$6.23	$0.00	$30.44
4	70	$19.24	$6.34	$6.23	$0.00	$31.81
5	75	$20.62	$6.34	$6.23	$0.00	$33.19
6	80	$21.99	$6.34	$6.23	$0.00	$34.56
7	85	$23.37	$6.34	$6.23	$0.00	$35.94
8	90	$24.74	$6.34	$6.23	$0.00	$37.31

Notes:

Apprentice to Journeyworker Ratio:1:5

RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	02/01/2016	$40.11	$11.00	$12.90	$0.00	$64.01

Apprentice - *ROOFER - Local 33*

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.06	$11.00	$3.39	$0.00	$34.45
2	60	$24.07	$11.00	$12.90	$0.00	$47.97
3	65	$26.07	$11.00	$12.90	$0.00	$49.97
4	75	$30.08	$11.00	$12.90	$0.00	$53.98
5	85	$34.09	$11.00	$12.90	$0.00	$57.99

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.

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 33*	02/01/2016	$40.36	$11.00	$12.90	$0.00	$64.26
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2016	$43.31	$10.70	$21.95	$2.28	$78.24
	08/01/2016	$44.46	$10.70	$21.95	$2.28	$79.39
	02/01/2017	$45.56	$10.70	$21.95	$2.28	$80.49
	08/01/2017	$46.66	$10.70	$21.95	$2.28	$81.59
	02/01/2018	$47.81	$10.70	$21.95	$2.28	$82.74

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.32	$10.70	$4.90	$0.00	$32.92
2	40	$17.32	$10.70	$4.90	$0.00	$32.92
3	45	$19.49	$10.70	$9.79	$1.20	$41.18
4	45	$19.49	$10.70	$9.79	$1.20	$41.18
5	50	$21.66	$10.70	$10.65	$1.29	$44.30
6	50	$21.66	$10.70	$10.90	$1.30	$44.56
7	60	$25.99	$10.70	$12.37	$1.47	$50.53
8	65	$28.15	$10.70	$13.24	$1.56	$53.65
9	75	$32.48	$10.70	$14.97	$1.74	$59.89
10	85	$36.81	$10.70	$16.18	$1.91	$65.60

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.78	$10.70	$4.90	$0.00	$33.38
2	40	$17.78	$10.70	$4.90	$0.00	$33.38
3	45	$20.01	$10.70	$9.79	$1.22	$41.72
4	45	$20.01	$10.70	$9.79	$1.22	$41.72
5	50	$22.23	$10.70	$10.65	$1.31	$44.89
6	50	$22.23	$10.70	$10.90	$1.31	$45.14
7	60	$26.68	$10.70	$12.37	$1.49	$51.24
8	65	$28.90	$10.70	$13.24	$1.59	$54.43
9	75	$33.35	$10.70	$14.97	$1.77	$60.79
10	85	$37.79	$10.70	$16.18	$1.94	$66.61

Notes:

Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SIGN ERECTOR *PAINTERS LOCAL 35 - ZONE 1*	06/01/2013	$25.81	$7.07	$7.05	$0.00	$39.93

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SIGN ERECTOR - Local 35 Zone 1*

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$12.91	$7.07	$0.00	$0.00	$19.98
2	55	$14.20	$7.07	$2.45	$0.00	$23.72
3	60	$15.49	$7.07	$2.45	$0.00	$25.01
4	65	$16.78	$7.07	$2.45	$0.00	$26.30
5	70	$18.07	$7.07	$7.05	$0.00	$32.19
6	75	$19.36	$7.07	$7.05	$0.00	$33.48
7	80	$20.65	$7.07	$7.05	$0.00	$34.77
8	85	$21.94	$7.07	$7.05	$0.00	$36.06
9	90	$23.23	$7.07	$7.05	$0.00	$37.35

Notes:
Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$33.54	$10.41	$10.08	$0.00	$54.03
	08/01/2016	$33.54	$10.91	$10.08	$0.00	$54.53
	12/01/2016	$33.54	$10.91	$10.89	$0.00	$55.34
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$33.83	$10.41	$10.08	$0.00	$54.32
	08/01/2016	$33.83	$10.91	$10.08	$0.00	$54.82
	12/01/2016	$33.83	$10.91	$10.89	$0.00	$55.63
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1*	03/01/2016	$54.43	$8.67	$16.80	$0.00	$79.90
	10/01/2016	$55.53	$8.67	$16.80	$0.00	$81.00
	03/01/2017	$56.53	$8.67	$16.80	$0.00	$82.00

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 550 (Section A) Zone 1*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.05	$8.67	$8.55	$0.00	$36.27
2	40	$21.77	$8.67	$8.55	$0.00	$38.99
3	45	$24.49	$8.67	$8.55	$0.00	$41.71
4	50	$27.22	$8.67	$8.55	$0.00	$44.44
5	55	$29.94	$8.67	$8.55	$0.00	$47.16
6	60	$32.66	$8.67	$8.55	$0.00	$49.88
7	65	$35.38	$8.67	$8.55	$0.00	$52.60
8	70	$38.10	$8.67	$8.55	$0.00	$55.32
9	75	$40.82	$8.67	$8.55	$0.00	$58.04
10	80	$43.54	$8.67	$8.55	$0.00	$60.76

Effective Date - 10/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.44	$8.67	$8.55	$0.00	$36.66
2	40	$22.21	$8.67	$8.55	$0.00	$39.43
3	45	$24.99	$8.67	$8.55	$0.00	$42.21
4	50	$27.77	$8.67	$8.55	$0.00	$44.99
5	55	$30.54	$8.67	$8.55	$0.00	$47.76
6	60	$33.32	$8.67	$8.55	$0.00	$50.54
7	65	$36.09	$8.67	$8.55	$0.00	$53.31
8	70	$38.87	$8.67	$8.55	$0.00	$56.09
9	75	$41.65	$8.67	$8.55	$0.00	$58.87
10	80	$44.42	$8.67	$8.55	$0.00	$61.64

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 *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	03/01/2016	$34.63	$13.00	$14.55	$0.00	$62.18

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$13.85	$13.00	$0.42	$0.00	$27.27
2	40	$13.85	$13.00	$0.42	$0.00	$27.27
3	45	$15.58	$13.00	$11.52	$0.00	$40.10
4	45	$15.58	$13.00	$11.52	$0.00	$40.10
5	50	$17.32	$13.00	$11.79	$0.00	$42.11
6	55	$19.05	$13.00	$12.06	$0.00	$44.11
7	60	$20.78	$13.00	$12.34	$0.00	$46.12
8	65	$22.51	$13.00	$12.62	$0.00	$48.13
9	70	$24.24	$13.00	$12.90	$0.00	$50.14
10	75	$25.97	$13.00	$13.17	$0.00	$52.14

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2016	$48.80	$10.18	$19.14	$0.00	$78.12
	08/01/2016	$49.70	$10.18	$19.22	$0.00	$79.10
	02/01/2017	$50.27	$10.18	$19.22	$0.00	$79.67

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.40	$10.18	$19.14	$0.00	$53.72
2	60	$29.28	$10.18	$19.14	$0.00	$58.60
3	70	$34.16	$10.18	$19.14	$0.00	$63.48
4	80	$39.04	$10.18	$19.14	$0.00	$68.36
5	90	$43.92	$10.18	$19.14	$0.00	$73.24

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.85	$10.18	$19.22	$0.00	$54.25
2	60	$29.82	$10.18	$19.22	$0.00	$59.22
3	70	$34.79	$10.18	$19.22	$0.00	$64.19
4	80	$39.76	$10.18	$19.22	$0.00	$69.16
5	90	$44.73	$10.18	$19.22	$0.00	$74.13

Notes:

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	06/01/2016	$37.20	$7.45	$14.00	$0.00	$58.65
	12/01/2016	$38.20	$7.45	$14.00	$0.00	$59.65
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	06/01/2016	$35.92	$7.45	$14.00	$0.00	$57.37
	12/01/2016	$36.92	$7.45	$14.00	$0.00	$58.37
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2016	$35.80	$7.45	$14.00	$0.00	$57.25
	12/01/2016	$36.80	$7.45	$14.00	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$43.81	$10.00	$15.15	$0.00	$68.96
	12/01/2016	$45.04	$10.00	$15.15	$0.00	$70.19
	06/01/2017	$46.03	$10.00	$15.15	$0.00	$71.18
	12/01/2017	$47.02	$10.00	$15.15	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$34.12	$10.41	$10.08	$0.00	$54.61
	08/01/2016	$34.12	$10.91	$10.08	$0.00	$55.11
	12/01/2016	$34.12	$10.91	$10.89	$0.00	$55.92
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	06/01/2016	$48.08	$7.45	$14.40	$0.00	$69.93
	12/01/2016	$49.08	$7.45	$14.40	$0.00	$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	06/01/2016	$50.08	$7.45	$14.40	$0.00	$71.93
	12/01/2016	$51.08	$7.45	$14.40	$0.00	$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	06/01/2016	$40.15	$7.45	$14.40	$0.00	$62.00
	12/01/2016	$41.15	$7.45	$14.40	$0.00	$63.00
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	06/01/2016	$42.15	$7.45	$14.40	$0.00	$64.00
	12/01/2016	$43.15	$7.45	$14.40	$0.00	$65.00
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2016	$33.54	$10.41	$10.08	$0.00	$54.03
	08/01/2016	$33.54	$10.91	$10.08	$0.00	$54.53
	12/01/2016	$33.54	$10.91	$10.89	$0.00	$55.34
WAGON DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2016	$36.10	$7.45	$13.80	$0.00	$57.35
	12/01/2016	$37.10	$7.45	$13.80	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2016	$44.23	$10.00	$15.15	$0.00	$69.38
	12/01/2016	$45.48	$10.00	$15.15	$0.00	$70.63
	06/01/2017	$46.48	$10.00	$15.15	$0.00	$71.63
	12/01/2017	$47.48	$10.00	$15.15	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2016	$51.36	$11.07	$15.14	$0.00	$77.57
	09/01/2016	$52.41	$11.07	$15.14	$0.00	$78.62
	03/01/2017	$53.41	$11.07	$15.14	$0.00	$79.62
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

MASSACHUSETTS WEEKLY CERTIFIED PAYROLL REPORT FORM

Company's Name:	Address:	Phone No.:	Payroll No.:

Employer's Signature:	Title:	Contract No:	Tax Payer ID Number	Work Week Ending:

Awarding Authority's Name:	Public Works Project Name:	Public Works Project Location:	Min. Wage Rate Sheet Number

General / Prime Contractor's Name:	Subcontractor's Name:		"Employer" Hourly Fringe Benefit Contributions				
						(B+C+D+E)	(A x F)

Employee Name & Complete Address	Work Classification:	Employee is OSHA 10 certified (?)	Appr. Rate (%)	Hours Worked Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Project Hours (A) All Other Hours	Hourly Base Wage (B)	Health & Welfare Insurance (C)	ERISA Pension Plan (D)	Supp. Unemp. (E)	Total Hourly Prev. Wage (F)	Project Gross Wages / Total Gross Wages	Check No. (H)

Are all apprentice employees identified above currently registered with the MA DLS's Division of Apprentice Standards? YES ☐ NO ☐

For all apprentices performing work during the reporting period, attach a copy of the apprentice identification card issued by the Massachusetts Department of Labor Standards / Division of Apprentice Standards. No apprentices are identified above ☐

NOTE: Pursuant to MGL c. 149, s. 27B, every contractor and subcontractor is required to submit a **true and accurate** copy of their certified weekly payroll records to the awarding authority by first-class mail or e-mail. In addition, each weekly payroll must be accompanied by a statement of compliance signed by the employer. Failure to comply may result in the commencement of a criminal action or the issuance of a civil citation.

Date Received by Awarding Authority
/ /

Division of Labor and Industries Statement of Compliance

WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form is available from the Department of Labor Standards (DLS) at www.mass.gov/dols/pw and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

On a weekly basis, every contractor and subcontractor is required to submit a certified copy of their weekly payroll records to the awarding authority; this includes the payroll forms and the Statement of Compliance form. The certified payroll records must be submitted either by regular mail or by e-mail to the awarding authority. Once collected, the awarding authority is required to preserve those records for three years from the date of completion of the project.

Each such contractor and subcontractor shall furnish weekly **and** within 15 days after completion of its portion of the work, to the awarding authority directly by first-class mail or e-mail, a statement, executed by the contractor, subcontractor or by any authorized officer thereof who supervised the payment of wages, this form, accompanied by their payroll:

STATEMENT OF COMPLIANCE

_____, 20_____

I,_____,_____
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by _____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

GENERAL TERMS & CONDITIONS

General Conditions

GENERAL TERMS AND CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, RECONSTRUCTION, ALTERATION, REMODELING, OR REPAIR OF ANY PUBLIC BUILDING OR PUBLIC WORK IN THE CITY OF SOMERVILLE

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GENERAL TERMS AND CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, RECONSTRUCTION, INSTALLATION,

DEMOLITION, MAINTENANCE, OR REPAIR OF ANY PUBLIC BUILDING OR PUBLIC WORK IN THE CITY OF SOMERVILLE

ARTICLE 1: DEFINITIONS

1.1. In General.

1.1.1. Well-known meanings. When words or phrases that have a wellknown- technical, or construction industry, or trade meaning are used in the Contract Documents, such words or phrases shall be interpreted in accordance with that meaning, unless otherwise stated.

1.1.2. Capitalization. The words and terms defined in this Article are capitalized in these General Terms and Conditions of the Contract. Other capitalized words may refer to a specific document found in the Contract Documents.

1.1.3. Persons. Whenever the word person or persons is used, it includes, unless otherwise stated, entity or entities, respectively, including, but not limited to, corporations, partnerships, and joint venturers.

1.1.4. Singular and Plural. The following terms have the meanings indicated which are applicable to both the singular and the plural thereof.

1.2. Definitions.

1.2.1. Agreement. The Agreement is the written document between the **City** and the **Contractor** which is titled: Agreement between the City of Somerville and the Contractor, which is the executed portion of the Contract, and which forms a part of the Contract. The Agreement also includes all documents required to be attached thereto, including, but not limited to, the performance bond, the labor and materials or payment bonds, certificates of insurance, and all Modifications of the Agreement.

1.2.2. Change Order. A Change Order is a document which is signed by the **Contractor**, the **Design Professional**, and the **City;** which is directed to the **Contractor;** which authorizes the **Contractor** to make an addition to, a deletion from or a revision in the Work, or an adjustment in the Contract Sum or in the Contract Time; and which is issued on or after the date of the Agreement between the **Contractor** and the **City.**

1.2.3. City. The **City** refers to the City of Somerville, which is the owner of the Project and is the public awarding authority with whom the **Contractor** has entered into the Contract and for whom the Work is to be provided.

1.2.4. Claim. A Claim is a dispute, demand, or assertion by one of the parties arising out of or relating to the Contract for which such party is seeking relief.

1.2.5. Contract. The Contract consists of all the Contract Documents. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations**,** representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification to the Contract signed by both parties.

1.2.6. Contract Documents. The Contract Documents consist of the Agreement; the notice of award of the Contract; the Notice to Proceed; the entire Project Manual; Change Orders; Construction Change Directives; the **Contractor's** Bid and all accompanying documents; and the **Design Professional's** written interpretations and clarifications issued on or after the issuance of the Notice to Proceed. Shop Drawing submittals and reports or drawings utilized by the **Design Professional** in preparing the Contract Documents are not Contract Documents.

1.2.7. Contractor. The **Contractor** is the person who is awarded the Contract for the Project herein pursuant to M.G.L. c. 149, §44A or M.G.L. c. 39, §39M; and is identified in the Agreement as such. The term "**Contractor**" is intended to include the **Contractor** as well as its authorized representative(s).

1.2.8. Contract Sum. The Contract Sum is the total amount stated in the Agreement payable by the **City** to the **Contractor** for the completion of the Work in accordance with the Contract Documents.

1.2.9. Contract Time. Unless otherwise provided, the Contract Time is the number of days allotted in the Contract Documents or the dates stated in the Agreement, including authorized adjustments, for Substantial Completion. We usually put a contract end date that is beyond the date of substantial completion.

1.2.10. Coordination Drawings. Coordination Drawings are those drawings, which are prepared by the **Contractor** or a Subcontractor that show the exact alignment, physical locations, and configuration of the mechanical, electrical, and fire protection installations.

1.2.11. Day. The term "day" shall mean calendar day unless otherwise stated.

1.2.12. Design Professional. The **Design Professional** is the person lawfully licensed to practice architecture, engineering, or landscape architecture and has been selected by the **City** to administer the Contract. The term "**Design Professional**," while referred to in the singular, means the **Design Professional** and/or the **Design Professional's** representative. For the purposes of this project, **Design Professional** shall mean the firm of Kleinfelder, Inc., Cambridge, MA, and appropriate consultants.

1.2.13. Field Order. A Field Order is a written order issued by the **Design Professional** which orders minor changes in the Work, but which does not involve a change in the Contract Sum or the Contract Time.

1.2.14. Final Completion. Final Completion is the point in time when the Design Professional finds that the Work has been fully completed in accordance with the Contract Documents. Final Completion shall be no later than thirty (30) days after Substantial Completion.

1.2.15. General Requirements. General Requirements refer to Sections of Division 1 of the Specifications.

1.2.16. Modification. A Modification is a written instrument that amends the Contract after execution of the Agreement.

1.2.17. Notice to Proceed. A Notice to Proceed is a written notice given by the **City,** or the **Design Professional**, to the **Contractor** fixing the date on which the Contract Time will begin to run and on which the **Contractor** shall start to perform its obligations under the Contract Documents.

1.2.18. Plans. The Plans are the drawings which are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location, dimensions, scope, extent, and character of the Work to be furnished and performed by the **Contractor** and which have been prepared or approved by the **Design Professional**.

1.2.19. Product Data. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the **Contractor** to illustrate materials or equipment for some portion of the Work. Product Data are not considered part of the Contract Documents.

1.2.20. Project. The Project is the total Work to be provided under the Contract Documents and may be the whole or a part as indicated elsewhere in the Contract Documents and may include construction by the **City** or by separate contractors. The Project is the Work described in the invitation to bid (advertisement) and Specifications and illustrated by the Plans, including any Modifications.

1.2.21. Project Manual. The Project Manual is the entire set of bidding documents which includes, but is not limited to, the invitation to bid (advertisement), the instructions to bidders, all of the forms, the wage rates, all City and state requirements, the General Terms and Conditions of the Contract, any supplementary conditions thereto, the Plans, the Specifications, and all addenda.

1.2.22. Proposed Change Order. A Proposed Change Order is a Change Order that has been submitted by the **Contractor** to the **Design Professional,** is under review, and has not been approved by the **City**.

1.2.23. Samples. Samples are physical examples of materials, equipment, or

workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged. Samples are not considered part of the Contract Documents.

1.2.24. Shop Drawings. Shop Drawings are all drawings, diagrams, illustrations, schedules, and other information that are specifically prepared or assembled by or for the **Contractor** and submitted by the **Contractor** to illustrate some portion of the Work. Shop Drawings are not considered part of the Contract Documents.

1.2.25. Site. The Site is the location of the Project and of the Work.

1.2.26. Specifications. Specifications are those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

1.2.27. Subcontractor. A Subcontractor is a person who contracts directly with the **Contractor**, unless otherwise stated.

1.2.28. Submittals. Submittals are those Shop Drawings, Product Data, Samples, or any other required document that are provided to the Design Professional for review and approval.

1.2.29. Substantial Completion. Substantial Completion means that the Work has been completed and the Site or the facility is opened for full and intended public use, except for minor incomplete or unsatisfactory items that do not materially impair the usefulness of the Work. The **Design Professional** shall decide what constitutes “minor,” “incomplete,” “unsatisfactory,” and “materially” and the **Design Professional's** decision shall be final.

1.2.30. Sub-subcontractor. A Subsubcontractor- is a person who has contracted directly with a Subcontractor.

1.2.31. Supplier. A Supplier is a manufacturer, fabricator, distributor, material person, or vendor having a direct contract with the Contractor or with any Subcontractor to furnish materials or equipment to be incorporated into the Work by the Contractor or any Subcontractor.

1.2.32. Work. Work refers to the services and the entire completed construction or the various separately identifiable parts thereof required by the Contract Documents, including all labor, materials, and equipment furnished, furnished and incorporated into the Project, or to be provided by the **Contractor** to fulfill the **Contractor's** obligations. The Work may constitute the whole or a part of the Project.

1.2.33. Construction Change Directive. A **Construction Change** Directive is a written directive to the **Contractor** ordering an addition to, a deletion from, or a revision to the Work issued on or after the date of the Agreement, signed by the **City**, and recommended by the **Design Professional**.

ARTICLE 2: ABOUT THE CONTRACT DOCUMENTS

2.1. Priority/Conflict.

2.1.1. Priority Among Contract Documents. In the event of conflict among the Contract Documents, the Contract Documents shall be construed according to the following priorities:

Highest Priority:	Modifications
Second Priority:	Agreement
Third Priority:	Addendalater- date to take precedence
Fourth Priority:	Supplementary General Conditions
Fifth Priority:	General Conditions
Sixth Priority:	Plans and Specifications

2.1.1.1. If there is a conflict between the Plans and Specifications, the figured dimensions shall govern over the scaled dimensions. Detailed Plans shall govern over the general Plans. Larger scale Plans shall take precedence over smaller scale Plans. Plans shall govern over Shop Drawings. Whenever notes, specifications, dimensions, details, or schedules in the Specifications or in the Plans, or between the Specifications and the Plans, or in all other instances not specifically noted above, the **Contractor** shall provide, unless otherwise directed by a Modification of the Contract, the better quality or greater quantity of Work at no increase in the Contract Sum or in the Contract Time.

2.1.1.2. Compliance with these priority conditions shall not justify any changes in the Work or any increase in the Contract Sum or Contract Time, unless any such compliance results in Work that may not be reasonably inferred from the Contract Documents as being required to produce the intended result as determined by the **Design Professional**.

2.1.2. Review of the Contract Documents and Field Conditions and Discovery of Conflict, Error, Ambiguity, or Discrepancy. Before starting the Work, and during the progress thereof, the **Contractor** shall carefully study and compare the Contract Documents with each other and with the information furnished by the **City** pursuant to Article 3 and shall at once report to the **Design Professional** any error, inconsistency, or omission the **Contractor** may discover. Any necessary change shall be ordered as provided in Article 11, subject to the requirements of any other provisions of the Contract Documents. The **Contractor** shall not proceed with the Work affected thereby (except in an emergency) until

a Modification has been issued. If the **Contractor** proceeds with the Work having discovered such errors, inconsistencies, or omissions contrary to the provisions contained herein, or if by reasonable study of the Contract Documents the **Contractor** could have discovered such, the **Contractor** shall bear all costs arising therefrom. The **Contractor** shall be liable to the **City** for failure to report any conflict, error, ambiguity, or discrepancy of which it knew or should have known.

2.1.3. Field Measurements. The **Contractor** shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the **Contractor** with the Contract Documents before commencing activities. Errors, inconsistencies, or omissions discovered shall be reported to the **Design Professional** at once.

2.1.4. Statutory Provisions. The **City** and the **Contractor** recognize that other rights duties and obligations with respect to public construction contracts are provided for by statute, notwithstanding the fact that they may not be provided for in the Contract Documents. In case of conflict between the statutory provisions and other provisions of the Contract Documents and the provisions of any applicable statute, the statutory provisions shall govern.

2.1.5. Voided or Unlawful Provisions. In the event any provision in the Contract is voided or deemed unlawful, such provision shall be deleted without affecting the remainder of the Contract.

2.2. Execution.

2.2.1. Execution of the Agreement by the **Contractor** is a representation that the **Contractor** has visited the Site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

2.3. Intent.

2.3.1. Entire Agreement. The Contract Documents comprise the entire agreement between the **City** and the **Contractor** concerning the Work**.** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the **Contractor**. The Contract Documents are complementary; what is required by one shall be as binding as if required by all. Performance by the **Contractor** shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. All Work mentioned or indicated in the Contract Documents shall be performed by the **Contractor** as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others.

2.3.2. Statutory Provisions. Each and every provision of law, code, and regulation, required by law to be inserted in these Contract Documents shall be deemed to be inserted

herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

2.3.3. Functionally Complete Project. It is the intent of the Contract Documents to describe a functionally complete Project. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the **Contractor**. Any Work, materials, or equipment that may be reasonably inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed by the **Contractor** whether or not specifically called for in the Contract Documents.

2.3.4. Indications or Notations. All indications or notations which apply to one of a number of similar situations, materials, or processes shall be deemed to apply to all such situations, materials, or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.

2.3.5. Standards or Quality of Materials or Workmanship. Where no explicit quality or standards for materials or workmanship are established for Work, such Work is to be of good quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the Project generally.

2.3.6. Manufactured Products. All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

2.3.7. Tests. When test boring or soil test information are included with the Contract Documents or otherwise made available to the **Contractor** and such test boring or soil test information was obtained by the **City** for use by the **Design Professional** in the design of the Project or Work, the **City** does not hold out such information to the **Contractor** as an accurate or approximate indication of subsurface conditions, and no claim for extra cost of extension of time resulting from a reliance by the **Contractor** on such information shall be allowed except as otherwise provided herein. Any such reports are not part of the Contract Documents.

2.3.8. Joining Work. Where the Work is to fit with existing conditions or work to be performed by others, the **Contractor** shall fully and completely join the Work with such conditions or work, unless otherwise specified.

2.4. Organization.

2.4.1. Except as provided in M.G.L. c. 149, §44F, the organization of the Specifications into divisions, sections, and articles, and the arrangement of Plans shall not

control the **Contractor** in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

2.5. References.

2.5.1. Where codes, manuals, specifications, standards, requirements and publications of public and private bodies are referred to in the Contract Documents whether specifically or by implication, references shall be understood to be to the latest revision prior to the date of receiving bids, except where otherwise indicated. Where statutes are referred to in the Contract Documents whether specifically or by implication, references shall be understood to be to the latest revision.

2.5.2. References herein to particular paragraphs or Articles are solely to facilitate finding additional information with regard to the specific matters and are not to be construed in any way as limiting the possible paragraphs and Articles in which such matters may be found elsewhere in this document.

2.6. Reuse of Design Professional's Written Instruments.

2.6.1. Neither the **Contractor** nor any Subcontractor or Supplier shall have or acquire any title to or ownership rights in any of the Plans, Specifications, or other documents prepared by the **Design Professional** and shall not reuse any of such Plans, Specifications, or other documents without prior written consent of the **City** and the **Design Professional**.

2.7. Written Material of the Contractor.

2.7.1. All written material prepared or collected by the **Contractor** in the course of completing the Work shall be the exclusive property of the **City** and shall not be used by the **Contractor** for any purpose other than the purpose of this Contract.

2.8. Modifying Words.

2.8.1. In the interest of simplicity, modifying words such as “all” and “any” may be omitted, but the fact that such words may be absent from one sentence and appear in another is not intended to affect the interpretation of either statement.

2.9. Use of Certain Words and Terms.

2.9.1. Whenever in the Contract Documents the terms “as ordered,” “as directed,” “as required,” “as allowed,” “as approved,” or terms of like effect or import are used, or the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the **City** or of the **Design Professional** as to the Work, it is intended that such requirement, direction, review, or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise).

2.9.2. The use of any such term or adjective shall not be effective to change the duties and responsibilities of the **City** or the **Design Professional** from those assigned in the Contract Documents or to assign any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of the Contract Documents.

2.9.3. When the words "Contractor," "Subcontractor," Subsubcontractor-," and "Supplier" are used, they are intended to include their employees and agents, unless otherwise specified.

2.10. Modification of the Contract Documents.

2.10.1. Major Modifications. Major Modifications may affect the Contract Sum or the Contract Time. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways, all of which must contain a written endorsement by the **City**:

2.10.1.1. a formal written amendment;

2.10.1.2. a Change Order;

2.10.1.3. a **Construction Change** Directive; or

2.10.1.4. the **Design Professional's** written interpretation, clarification, or decision.

2.10.2. Minor Modifications. Minor modifications do not affect the Contract Sum or the Contract Time. The requirements of the Contract Documents may be supplemented and minor variations and deviations of the Work may be authorized in one or more of the following ways:

2.10.2.1. a Field Order; or

2.10.2.2. the **Design Professional's** approval of a Shop Drawing or Sample.

ARTICLE 3: THE CITY

3.1. Signatory.

3.1.1. All documents which require a signature or an endorsement by the **City** must be signed by the Mayor in order to be deemed ratified by the **City**.

3.2. Requirements to Provide Documents.

3.2.1. To the extent they are available, the **City** shall furnish surveys describing physical characteristics, legal limitations, and utility locations for the site of the Project, and a legal description of the Site.

3.2.2. The **City** shall obtain and pay for necessary approvals, easements, assessments, and charges that are customarily secured prior to the execution of the Contract.

3.2.3. The **City** shall furnish information or services required of the **City** hereunder with reasonable promptness after receipt from the **Contractor** of a written request for such information or services.

3.2.4. The **City** shall provide the **Contractor**, at no charge, such copies of the Project Manual as are reasonably necessary for the execution of the Work.

3.3. Resident Project Representative

3.3.1. The **City** may engage a Resident **Project Representative** for this Project, in which case the **City** shall, upon request of the **Contractor**, provide the **Contractor** with a written statement of the duties, responsibilities, and limitations of authority of such Resident **Project Representative**. Except as expressly set forth in such written statement, the Resident **Project Representative** shall have no authority to approve Work, to approve Change Orders, or to exercise any of the power and authority of the **City** or the **Design Professional**. The Resident **Project Representative** shall observe the **Contractor's** operations and construction activities for general compliance with the Plans and Specifications. The Resident **Project Representative** shall have access to all areas of the Project at all times. The **Contractor** shall fully cooperate with the Resident **Project Representative** in the performance of the Resident **Project Representative**'s duties.

3.4. City's Right to Perform Construction and to Award Separate Contracts.

3.4.1. The **City** reserves the right to perform construction or operations at the Site with its own forces or others. If the **Contractor** claims that a delay or additional cost is involved because of such action by the **City**, the **Contractor** shall make such Claim as provided elsewhere in the Contract Documents.

3.4.2. When the separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "**Contractor**" in the Contract Documents in each case shall mean the **Contractor** who executes each separate City/Contractor- Agreement.

3.4.3. The **City** shall provide for coordination of the activities of the **City's** own forces and of each separate contractor with the Work of the **Contractor**, who shall cooperate with them. The **Contractor** shall afford each other person access to the Site and shall properly coordinate its Work with that of the persons performing other work. The **Contractor** shall participate with other separate contractors and the **City** in reviewing their construction schedules when directed to do so. The **Contractor** shall make any revisions to the construction schedules deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the **Contractor**, separate contractors, and the **City** until subsequently revised.

3.5. Limitations on the City's Responsibilities.

3.5.1. The **City** shall not supervise, direct, or have control or authority over, nor be responsible for the **Contractor's** means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, or for any failure of the **Contractor** to comply with laws, codes and regulations applicable to the furnishing or performance of the Work. The **City** will not be responsible for the **Contractor's** failure to perform or furnish the Work in accordance with the Contract Documents. The **City** is not responsible for the acts or omissions of the **Contractor**, any Subcontractor, Supplier, or anyone for whose acts the **Contractor**, any Subcontractor or Suppliers may be liable.

3.5.2. The **City's** authority to review any of the **Contractor's** progress schedules, or its decision to raise or not to raise any objections about such schedules shall not impose on the **City** any responsibility for the timing, planning, scheduling, or execution of the Work, nor in any way give rise to any duty or responsibility on the part of the **City** to exercise this authority for the benefit of the **Contractor**, any Subcontractor or Supplier or any other party.

3.5.3. The **City's** decision to raise or not to raise objections with regard to any aspects of the **Contractor's** insurance shall in no way give rise to any duty or responsibility on the part of the **City** to or for the benefit of the **Contractor**, any Subcontractor, any Supplier, or any other party.

3.6. Reservation of Rights.

3.6.1. The **City** reserves the right to correct at any time any error in any progress payment that may have been made.

3.6.2. Should defective Work be discovered subsequent to final payment, the **City** reserves the right to make a claim and recover all costs and professional fees associated therewith, including the cost of removing and/or replacing the defective Work.

3.7. Waivers.

3.7.1. All waivers by the **City** are valid only to the extent that they are signed by the **City**. Any such waivers pertain only to the specific matter contained in the waiver and not to any similar, subsequent matters.

ARTICLE 4: THE DESIGN PROFESSIONAL

4.1. City's Representative.

4.1.1. The **Design Professional** is the **City's** representative (1) during construction, (2) until final payment is due, and (3) with the **City's** concurrence, from time to time during the correction period described in Article 10. The **Design Professional** will advise and consult with the **City**. The **Design Professional** will have authority to act on behalf of the **City** only to the extent provided in the Contract Documents, unless otherwise modified by a written instrument in accordance with other provisions of the Contract.

4.1.2. The duties, responsibilities, and the limitations of authority of the **Design Professional** as the **City's** representative during construction are set forth in the Contract Documents and shall not be extended without the written consent of the **City** and the **Design Professional**.

4.2. Administration of the Contract.

4.2.1. The **Design Professional** will provide administration of the Contract as described in the Contract Documents, unless the **City** has engaged a construction manager.

4.3. Visits to the Site.

4.3.1. The **Design Professional** will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. However, the **Design Professional** will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of on-site observations as an architect, engineer, or landscape architect, the **Design Professional** will keep the **City** informed of progress of the Work in writing and will endeavor to guard the **City** against defects and deficiencies in the Work.

4.4. Communications Facilitating Contract Administration.

4.4.1. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the **City** and the **Contractor** shall endeavor to communicate through the **Design Professional**. Communications by and with the **Design Professional's** consultants shall be through the **Design Professional**. Communications by and with Subcontractors and Suppliers shall be through the **Contractor**. Communications by and with **City** employees and separate contractors shall be through the **City**.

4.4.2. When it deems it necessary or expedient, the **City** may communicate directly with the **Contractor**, any Subcontractors, Suppliers, or consultants.

4.5. Certification of Applications for Payment.

4.5.1. Based on the **Design Professional's** observations and evaluations of the **Contractor's** applications for payment, the **Design Professional** will review and certify the amounts due the **Contractor** and will issue certificates for payment in such amounts.

4.6. Rejection of Work.

4.6.1. The **Design Professional** will have authority to reject or disapprove Work (1) that does not conform to the Contract Documents; (2) that the **Design Professional** believes to be defective; and (3) that the **Design Professional** believes will not produce a completed Project conforming to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Whenever the **Design Professional** considers it necessary or advisable for implementation of the intent of the Contract Documents, the **Design Professional** will have authority to require

additional inspection or testing of the Work in accordance with Article 9, whether or not such Work is fabricated, installed, or completed. However, neither this authority of the **Design Professional** nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the **Design Professional** to the **Contractor**, Subcontractors, Suppliers, or other persons performing portions of the Work.

4.7. Review of Submittals.

4.7.1. The **Design Professional** will review or take other appropriate action upon the **Contractor's** submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and only to the extent that the **Design Professional** believes desirable to protect the **City's** interest. The **Design Professional's** action will be taken with reasonable promptness, while allowing sufficient time in the **Design Professional's** professional judgment to permit adequate review, taking into account the time periods set forth in the latest schedule prepared by the **Contractor** and approved by the **Design Professional**. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the **Contractor** as required by the Contract Documents. The **Design Professional's** review of the **Contractor's** submittals shall not relieve the **Contractor** of the obligations under Article 5. The **Design Professional's** review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The **Design Professional's** approval of a specific item shall not indicate approval of an assembly of which the item is a component. After the rejection of the second resubmittal of any one Submittal, the **Contractor** shall bear the cost of the review of each subsequent resubmittal.

4.8. Preparation of Change Orders and Construction Change Directives.

4.8.1. The **Design Professional** will prepare Change Orders and **Construction Change** Directives and may authorize minor Modifications in the Work as provided in Article 11.

4.9. Inspections.

4.9.1. The **Design Professional** will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; will receive and forward to the **City** for the **City's** review and records written warranties and related documents required by the Contract and assembled by the **Contractor**; and will issue a final certificate for payment upon the **Contractor's** compliance with all of the requirements of the Contract Documents.

4.10. Interpretations, Clarifications, and Decisions.

4.10.1. The **Design Professional** will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of either the **City** or the **Contractor**. The **Design Professional's** response to such requests will be made with reasonable promptness and within the time set forth in the Agreement between the **City** and the **Design Professional**. Any such written interpretations, clarifications, and decisions shall be binding on the **Contractor**.

4.10.2. Interpretations, clarifications, and decisions of the **Design Professional** will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. The **Design Professional** will not be liable to the **Contractor**, any Subcontractor, or Supplier for results of interpretations, clarifications, or decisions so rendered in good faith.

4.10.3. The **Design Professional** may, as the **Design Professional** judges desirable, issue additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Work; such drawings or instructions may be effected by a Field Order or other notice to the **Contractor**, and provided such drawings or instructions are reasonably consistent with the previously existing Contract Documents, the Work shall be executed in accordance with such additional drawings or instructions without any additional cost or an extension of the Contract Time.

4.10.4. The **Design Professional's** decisions on matters relating to aesthetic effect must be consistent with the **City's** and will be final.

4.11. Limitation on the Design Professional's Responsibilities.

4.11.1. Neither the **Design Professional's** authority to act under the provisions of the Contract Documents nor any decision made by the **Design Professional** in good faith to exercise or not to exercise such authority shall give rise to any duty or responsibility of the **Design Professional** to the **Contractor**, any Subcontractor, any Supplier, any surety for any of them or any other person.

4.11.2. The **Design Professional** will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the **Contractor's** responsibility as provided in Article 5. The **Design Professional** will not be responsible for the **Contractor's** failure to carry out the Work in accordance with the Contract Documents. The **Design Professional** will not have control over or charge of and will not be responsible for acts or omissions of the **Contractor**, Subcontractors, Suppliers, or of any other persons performing portions of the Work.

ARTICLE 5: THE CONTRACTOR

5.1. Relationship with the City.

5.1.1. The **Contractor** is an independent contractor and not an employee of the **City.** The **Contractor** is engaged by virtue of the Contract to perform only those services contained therein. The **Contractor** is not authorized to contract on behalf of the **City** or to incur any liability on the part of the **City**.

5.2. Code of Conduct.

5.2.1. M.G.L. c. 268A establishes standards of conduct for officials and employees of the **City**. The **Contractor** shall familiarize itself with the statute and act accordingly.

5.3. Quality Assurance.

5.3.1. The **Contractor** shall be responsible for ensuring that it, all Subcontractors, Suppliers, and all persons employed to do the Work under the Contract Documents perform in a professional manner, provide a high quality of service and Work, and perform in accordance with the Contract Documents.

5.4. Supervision.

5.4.1. Competence and Efficiency. The **Contractor** shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills, attention and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

5.4.2. Construction Means, Methods, Techniques, Etc. The **Contractor** shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract. Where the Contract Documents refer to particular construction means, methods, techniques, sequences, or procedures or indicate or imply that such are to be used in the Work, such mention is intended only to indicate that the operations of the **Contractor** shall be such as to produce at least the quality of Work implied by the operations described. The actual determination of whether or not the described operations may be safely and suitably employed on the Work shall be the responsibility of the **Contractor**, who shall notify the **Design Professional** in writing, prior to implementation, of the actual means, methods, techniques, sequences, or procedures which will be employed on the Work, if these differ from those mentioned in the Contract Documents. All loss, damage, liability or cost of correcting defective work arising from the employment of any construction means, methods, techniques, sequences, or procedures shall be borne by the **Contractor**, notwithstanding that such construction means, methods, techniques, sequences, or procedures are referred to, indicated or implied by the Contract Documents, unless the **Contractor** has given timely notice to the **City** and the **Design Professional** in writing that such means, methods, techniques, sequences, or procedures are not safe or suitable, and the **City** has then instructed the **Contractor** in writing to proceed at the **City's** risk.

5.4.3. Variance between the Contract Documents and Statutes, Ordinances, Codes, Rules, and Regulations. The **Contractor** shall promptly notify the **Design Professional** and the **City** in writing of any variances between the Contract Documents and statutes, ordinances, codes, rules, and regulations. If the **Contractor,** without written notice to the **Design Professional** and the **City,** performs Work knowing that it is contrary to statutes, ordinances, codes, rules, and regulations, the **Contractor** shall assume full responsibility for such Work and shall bear the costs associated therewith, i.e., replacement, repairs, removal, and fines.

5.4.4. Acts and Omissions. The **Contractor** shall be responsible to the **City** for the acts

and omissions of all persons performing or supplying the Work.

5.4.5. Inspections. The **Contractor** shall be responsible for inspection of portions of Work already performed under this Contract to determine whether such portions are in proper condition to receive subsequent Work.

5.5. Personnel.

5.5.1. Suitability. The **Contractor** shall provide competent, properly licensed and/or certified, suitably qualified, and reliable personnel to perform the Work required by the Contract Documents. The **Contractor** shall enforce strict discipline and maintain good order at the site at all times. The **Contractor** shall not employ any Subcontractor, Supplier, or other person, whether initially or as a substitute, against whom the **City** may have reasonable objection. Acceptance of any Subcontractor or other person by the **City** shall not constitute a waiver of any right of the **City** to reject defective Work.

5.5.2. Sexual Harassment. Sexual harassment is an unlawful practice under M.G.L. c. 151B. The **Contractor**, Subcontractors, and all other persons responsible for any portion of the Work shall refrain from engaging in sexual harassment. The **Contractor** shall be responsible for any acts of sexual harassment committed by any persons responsible for any portion of the Work. The **Contractor** shall take appropriate action against any such individuals.

5.5.3. Weapons and Illegal Drugs. No weapons or illegal drugs are permitted on the Site. It is the responsibility of the **Contractor** to ensure that no weapons or illegal drugs are brought to the Site.

5.5.4. Maximum Work Day and Work Week. (*Reference:* M.G.L. c. 149, §§30 and 34;). No laborer, worker, mechanic, foreperson or inspector working within this Commonwealth in the employ of the **Contractor**, Subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the Contract, shall be required to work more than twelve (12) hours in any one day over a two-week period, or more than six (6) days in any one week, except in cases of emergency.

5.5.5. Lodging. (*Reference:* M.G.L. c. 149, §25;). Every employee under this Contract shall lodge, board and trade where and with whom he or she elects, and neither the **Contractor** nor its agents or employees shall, either directly or indirectly, require as a condition of the employment of any person that the employee shall lodge, board or trade at a particular place or with a particular person.

5.5.6. Wage Rates. (*Reference:* M.G.L. c. 149, §27). Mechanics and apprentices, teamsters, chauffeurs and laborers performing Work shall be paid no less than the minimum rate of wages included in the bid documents and the Project Manual and which are made part of the Contract. They shall continue to be the minimum rate of wages for said employees during the life of the Contract. The **Contractor** shall keep a legible copy of the wage rates posted in a conspicuous place at the site during the life of the Contract. These rates of wages shall include

payments by employers to health and welfare plans, pension plans and supplementary unemployment benefit plans as provided in M.G.L. c. 149, §26;, and such payments shall be considered as payments to persons under M.G.L. c. 149, §27 performing work as therein provided. If the **Contractor** does not make payments to a health and welfare plan, a pension plan and a supplementary unemployment benefit plan, where such payments are included in the rates of wages, the **Contractor** shall pay the amount of said payments directly to each employee engaged in the Work. If the **Contractor** pays less than the rate of wages, including payments to health and welfare funds and pension funds, or the equivalent payments in wages to any person performing Work within the classifications as determined by the Commissioner of Labor and Industries, and if the **Contractor** takes or receives for its own use or the use of any other person, as a rebate, refund or gratuity, or in any other guise, any part or portion of the wages, including payments to health and welfare funds and pension funds, or the equivalent payment in wages, paid to such person for Work done or service rendered on the Project, the **Contractor** will be subject to the penalties set forth in M.G.L. c. 149, §27. Notwithstanding the foregoing and the requirements of 5.5.7.1 and 5.5.7.2 below, if the Contract is federally funded, federal labor standards apply, including Davis Bacon minimum wage rates and payroll reporting requirements. See the "Federal Requirements" section at the end of these contract documents.

5.5.7. Payroll Records of Employees. (*Reference:* M.G.L. c. 149, §27B;). The **Contractor** and all Subcontractors who are subject to M.G.L. c. 149, §§27 and 27A shall keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs, and laborers performing Work showing the name, address and occupational classification of each such employee, the hours worked by and the wages paid to all such employees. The **Contractor** and the Subcontractors shall submit a copy of said record to the **City** on a weekly basis.

5.5.7.1. (*Reference:* M.G.L. c. 149, §27B;). The **Contractor** and all Subcontractors who are subject to M.G.L. c. 149, §§27 and 27A shall preserve their payroll records for a period of three (3) years from the date of completion of the Contract.

5.5.7.2. (*Reference:* M.G.L. c. 149, §27B). The **Contractor** and all Subcontractors who are subject to M.G.L. c. 149, §§27 and 27A shall furnish to the Commissioner of Labor and Industries and the **City** within fifteen (15) days after completion of their portion of the Work a statement executed by the **Contractor** or Subcontractor or by any authorized officer or employee of the **Contractor** or Subcontractor who supervises the payment of wages in the form found in M.G.L. c.149, §27B.

5.6. Superintendence.

5.6.1. Employment of a Superintendent. The **Contractor** shall employ a competent, properly licensed superintendent, reasonably acceptable to the **City**, and necessary assistants who shall be in attendance at the Site full time during the progress of the Work until the date of Substantial Completion and for such additional time thereafter as the **Design Professional** or the **City** may determine to be necessary for the expeditious completion of the Work, including final completion. If continually in the employ of the Contractor, the same Superintendent shall be

assigned to this project.

5.6.2. Removal/Replacement of a Superintendent. The **Contractor** shall remove the superintendent if requested to do so in writing by the **City** and shall promptly replace such superintendent with a competent person reasonably acceptable to the **City**. The superintendent shall represent the **Contractor**, and communications given to the superintendent shall be as binding as if given to the **Contractor**. The **Contractor** shall not replace the superintendent without written notice to the **City** and the **Design Professional**.

5.6.3. Registered Professional Engineer or Registered Land Surveyor. The **Contractor** shall retain a competent Registered Professional Engineer or Registered Land Surveyor, acceptable to the **Engineer**, who shall establish the exterior lines and required elevations of all buildings and structures to be erected on the site and shall establish sufficient lines and grades for the construction of associated Work such as, but not limited to, roads, utilities, and site grading. The Engineer or Land Surveyor shall certify as to the actual location of the constructed facilities in relation to property lines, building lines, easements, and other restrictive boundaries.

5.6.4. Building Grades, Lines, Etc.; The **Contractor** shall establish the building grades; lines; levels; and column, wall and partition lines required by the various Subcontractors in laying out their Work.

5.6.5. Coordination and Supervision. The **Contractor** shall coordinate and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. The **Contractor** and all Subcontractors shall at all times afford each trade, any separate contractor, or the **City**, every reasonable opportunity for the installation of Work and the storage of materials.

5.6.6. Job Meetings. There shall be job meetings held on a weekly basis, or more often if required by the **City**. The **Contractor** shall arrange for and attend weekly job meetings with the **Design Professional** and such other persons as the **Design Professional** may from time to time wish to have present. The **Contractor** shall be represented by a principal, project manager, general superintendent or other authorized main office representative, as well as by the **Contractor's** own superintendent. An authorized representative of any Subcontractor or Subsubcontractor- shall attend such meetings if the representative's presence is requested by the **Design Professional**. Such representatives shall be empowered to make binding commitments on all matters to be discussed at such meetings, including costs, payments, Change Orders, time schedules and workforce power. Any notices required under the Contract may be served on such representatives.

5.7. Materials, Labor, Equipment, Etc.

5.7.1. Provision of. Unless otherwise provided in the Contract Documents, the **Contractor** shall furnish and assume full responsibility for all 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 furnishing, performance, testing, start-up, and completion of the Work.

5.7.2. Quality and Use of. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by the **Design Professional**, the **Contractor** shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

5.7.3. Discrepancies or Defects. If the **Contractor** is unable to perform its Work because of discrepancies or defects in the work of the **City's** own forces or of a separate contractor, the **Contractor** shall immediately notify the **Design Professional** and the **City** in writing of the conditions that render unable to so perform. Failure to notify the **Design Professional** constitutes an acknowledgment and acceptance of the other work as being fit and proper for integration with the **Contractor's** Work except for latent or nonapparent- defects and deficiencies in the other work.

5.8. Contractor's Management and Financial Statement Requirements. (*Reference:* M.G.L. c. 30, §39R)

5.8.1. The words defined herein shall have the meaning stated below whenever they appear in this Paragraph:

5.8.1.1. "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to M.G.L. c.149, §44A-H or M.G.L. c. 30, §39M, inclusive.

5.8.1.2. "Contract" means any contract awarded or executed pursuant to M.G.L. c. 149, §44A-H or M.G.L. c. 30, §39M, which is for an amount or estimate amount that exceed the dollar amount set forth in M.G.L. c. 30, §39R.

5.8.1.3. "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.

5.8.1.4. "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of his/her residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the

filing of reports with the **City**.

5.8.1.5. "Audit," when used in regard to financial statement, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a certified opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.

5.8.1.6. "Accountant's Report," when used in regard to financial statements, means a document in which an independent certified accountant indicates the scope of the audit which s/he has made and sets forth his/her opinion regarding the financial statements taken as a whole with listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefore shall be stated. An accountant's report shall include as part thereof a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the contractor.

5.8.1.7. "Management," when used herein, means the chief executive officers, partners, principals or other person or persons primarily responsible for the financial and operational policies and practices of the Contractor.

5.8.1.8. Accounting terms, unless otherwise defined herein shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

5.8.2. The Contractor shall make, and keep for at least six (6) years after final payment, books, Records, and accounts that in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor.

5.8.3. Until the expiration of six (6) years after final payment, the Office of the Inspector General, and the Deputy Commissioner of the Division of Capital Asset Management shall have the right to examine any books, documents, papers or Records of the Contractor or of its Subcontractors that directly pertain to, and involve transactions relating to, the Contractor or its Subcontractors.

5.8.4. The Contractor shall describe any change in the method of maintaining Records or recording transactions which materially affect any statements filed with the **City**, including in its description the date of the change and reasons therefore, and shall accompany said description with a letter from the Contractor's Independent Certified Public Accountant approving or otherwise commenting on the changes.

5.8.5. The Contractor shall file a Statement of Management on internal accounting

controls as set forth below prior to the execution of the Contract.

5.8.6. The Contractor shall file prior to the execution of the contract and shall continue to file annually, an Audited Financial Statement for the most recent completed fiscal year as set forth below.

5.8.7. The Contractor shall file with the **City** a Statement of Management as to whether the system of internal accounting controls of the Contractor and its subsidiaries reasonably assures that:

5.8.7.1. transactions are executed in accordance with Management's general and specific authorization;

5.8.7.2. transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles, and to maintain accountability for assets;

5.8.7.3. access to assets is permitted only in accordance with Management's general or specific authorization; and

5.8.7.4. the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any difference.

5.8.7.5. The Contractor shall also file with the **City** a statement prepared and signed by an Independent Certified Public Accountant stating that s/he has examined the Statement of Management on internal accounting controls, and expressing an opinion as to:

5.8.7.5.1. whether the representation of Management in response to this paragraph and paragraphs 5.8.2. through 5.8.6 above are consistent with the result of Management's evaluation of the system of internal accounting controls; and

5.8.7.5.2. whether such representations of Management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

5.8.8. The Contractor shall annually file with the Commissioner of the Division of Capital Asset Management during the term of the contract a financial statement prepared by an Independent Certified Public Accountant on the basis of an Audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report. Such statements shall be made available to the **City** upon request.

5.9. Taxes.

5.9.1 The **Contractor** shall pay all sales, consumer, use, and other similar taxes for the Work or portions thereof which are provided by the **Contractor** which are legally enacted when bids are received, whether or not yet effective or merely scheduled to go into effect. However, the **Contractor** shall not pay, and the **City** shall not reimburse or pay the **Contractor** for, any sales taxes for building supplies or materials for which an exemption is provided in M.G.L. c. 64H, §6(f). The **City's** tax exemption number to be used by the **Contractor** in this regard is E04-600-1414.

5.10. Permits, Licenses, and Fees.

5.10.1 Unless otherwise provided, the **Contractor** shall obtain and pay the fees for all permits, licenses, and inspections that are necessary for the proper execution and completion of the Work and which are customarily secured after execution of the Contract and which are legally required. All fees for permits, and inspections required by any **City** department shall be waived. Fees for licenses (e.g. drainlayer's license) are not waived. In addition the contractor shall pay for water meters and water usage. The contractor is responsible for obtaining NSTAR work orders and paying all costs and fees associated with NSTAR work.

5.11. Notices Required By Statutes, Ordinances, Codes, Rules, Regulations, and Orders of the City.

5.11.1 The **Contractor** shall give notices required by statutes, ordinances, codes, rules, regulations, and orders of the **City** bearing on performance of the Work.

5.12. Additional Information from Design Professional.

5.12.1. The **Contractor** shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Article 4.

5.12.2. The **Contractor** shall give the **Design Professional** timely notice of any additional Plans, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work.

5.12.3. The **Contractor** shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but shall request additional drawings or instructions from the **Design Professional** as provided in the previous Paragraph. If the **Contractor** proceeds with such Work without obtaining further drawings, Specifications, or instructions, the **Contractor** shall correct Work incorrectly done at the **Contractor's** own expense.

5.13. "Or equal."

5.13.1. Requirements for Substitutions. (*Reference:* M.G.L. c. 30, §39M(b).) Where products or materials are prescribed by manufacturer name, trade name, or catalog reference, the words "or approved equal" shall be understood to follow. An item shall be considered equal to the item so named or described if, in the opinion of the **Design Professional**:

5.13.1.1. it is at least equal in quality, durability, appearance, strength, and design;

5.13.1.2. it performs at least equally the function imposed by the general design for the Work;

5.13.1.3. it conforms substantially, even with deviations, to the detailed requirements for the items as indicated by the Specifications.

5.13.2. Net Savings. No proposed substitution will be permitted unless the **Contractor** certifies that the proposed substitution will yield a net savings to the **City** and will not extend the Contract Time.

5.13.3. Contractor's Expense. Any structural or mechanical changes made necessary to accommodate substituted equipment under this paragraph (including but not limited to engineering fees) shall be at the expense of the **Contractor** or **Subcontractor** responsible for the Work item.

5.13.3.1. Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the **Contractor**, notwithstanding approval or acceptance of such substitution by the **City** or the **Design Professional**, unless such substitution was made at the written request or direction of the **City** or the **Design Professional**.

5.13.3.2. All data to be provided by the **Contractor** in support of any proposed "or equal" or substitute item will be at the **Contractor's** expense.

5.13.4. Meeting Requirements. The **Contractor** shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The **Design Professional** may require the **Contractor** to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the **Design Professional,** would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents. All such data shall be furnished at the **Contractor's** expense. This provision shall not require the **Contractor** to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the **Contractor's** expense.

5.13.5. Named Manufacturer's Product. In all cases in which a manufacturer's name, trade name, or other proprietary designation is used in connection with materials or articles to be furnished under this Contract, whether or not the phrase "or equal" is used after such name, the **Contractor** shall furnish the product of the name manufacturer(s) without substitution, unless a written request for a substitute has been submitted by the **Contractor** and approved in writing by the **Design Professional** as provided in the following paragraph.

5.13.6. Deviations. If the **Contractor** proposes to use a material which while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the **Contractor** shall inform the **Design Professional** in writing of the nature of such deviations at the time the material is submitted for approval and shall request written approval of the deviation from the requirements of the Contract Documents.

5.13.7. Rejection of Deviations. In requesting approval of deviations or substitutions, the **Contractor** shall provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality of result at least equal to that otherwise attainable. If, in the opinion of the **Design Professional**, the evidence presented by the **Contractor** does not provide a sufficient basis for such reasonable certainty, the **Design Professional** may reject such substitution or deviation without further investigation.

5.13.8. Consistent Character and Quality of Design. The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the Project. The **Design Professional** shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The **Design Professional** will not approve as equal to materials specified proposed substitutes that, in the **Design Professional's** opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the **Contractor** shall, if required by the **Design Professional**, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the **City**.

5.13.9. Warranty. The warranties provided herein shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

5.13.10. Design Professional's Approval. The **Design Professional** will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed, or utilized without the **Design Professional's** prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. The **City** may require the **Contractor** to furnish at the **Contractor's** expense a special performance guarantee or other surety with respect to any "or equal" or substitute. The **Design Professional** will record the time required by the **Design Professional** and its consultants in evaluating substitutes proposed or submitted by the **Contractor** and in making changes in the Contract Documents (or in the provisions of any other direct contract with the **City** for work on the Project) occasioned thereby. Whether or not the **Design Professional** accepts a substitute item so proposed or submitted by the **Contractor**, the **Contractor** shall reimburse the **City** for the charges of the **Design Professional** and its consultants for evaluating each such proposed substitute item.

5.14. Substitute Construction Methods or Procedures.

5.14.1 If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, the **Contractor** may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to the **Design Professional**. The **Contractor** shall submit sufficient information to allow the **Design Professional**, in the **Design Professional's** sole discretion, to determine whether the substitute proposed is equivalent to that expressly called for by the Contract Documents.

5.15. Contractor's Progress Schedule.

5.15.1. Before Starting Construction. Within ten (10) days after the date of the Notice to Proceed, the **Contractor** shall submit to the **Design Professional** for review:

5.15.1.1. a preliminary progress schedule indicating the times (number of days or dates) for starting and completing the various stages of the Work;

5.15.1.2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; and

5.15.1.3. a refined schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Sum and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

5.15.2. Review of Progress Schedule. At least ten (10) days prior to the commencement of construction, the **Design Professional**, the **Contractor,** and any other appropriate persons will meet to review and discuss the acceptability to the **Design Professional** of the progress schedule. The **Contractor** will have an additional ten (10) days to make corrections and adjustments and to complete and resubmit the schedule. No progress payment shall be made to the **Contractor** until the schedule is submitted to and found acceptable by the **Design Professional** as provided below.

5.15.3. Acceptability of Progress Schedule. The progress schedule will be acceptable to the **Design Professional** if, according to the **Design Professional**, it provides an orderly progression of the Work to completion within any specified time frame, but such acceptance will neither impose on the **Design Professional** responsibility for the sequencing, scheduling, or progress of the Work nor interfere with or relieve the **Contractor** from the **Contractor's** full responsibility therefore. The **Contractor's** schedule of Submittals must be acceptable to the **Design Professional** in providing a workable arrangement for reviewing and processing the required Submittals. The **Contractor's** schedule of values must be acceptable to the **Design Professional** as to form and substance.

5.15.4. Sepia and Copies. After the **Design Professional** has approved the schedule, the **Contractor** shall submit to the **Design Professional** one (1) sepia and four (4) copies bearing the **Contractor's** stamp of approval as a representation to the **City** that the **Contractor** has determined or verified all data on that progress schedule and that the **Contractor**, the Subcontractors and Suppliers have reviewed and coordinated the sequences in that progress schedule with the requirements of the Work.

5.15.5. Adjustment of Schedule. The **Contractor** shall adhere to the established progress schedule which may be adjusted from time to time as follows: the **Contractor** shall submit to the **Design Professional** for acceptance proposed adjustments in the progress schedule that will not change the Contract Time. Such adjustments will conform generally to the progress schedule then in effect and will comply with any provisions of the requirements applicable thereto.

5.15.6. During Construction. The **Contractor** shall submit monthly progress schedules to the **Design Professional**. The schedules shall stay current with the **Contractor's** approach to the Work remaining.

5.15.7. Schedule of Submittals. The **Contractor** shall prepare and keep current, for the **Design Professional's** approval, a schedule of Submittals that is coordinated with the **Contractor's** construction schedule and allows the **Design Professional** reasonable time to review Submittals.

5.16. Project Coordination.

5.16.1. In General. The **Contractor** shall be responsible for the proper coordination of the Work of all of the trades.

5.16.2. Coordination with Subcontractors. The **Contractor** shall coordinate the work of each Subcontractor with the Work of every other Subcontractor whose Work affects the other.

5.16.3. Coordination with the City's Own Forces or Separate Contractors. The **Contractor** shall coordinate its operations with those of the **City's** own forces or separate contractors. The **Contractor** shall provide the **City's** own forces and separate contractors a reasonable opportunity for the handling, unloading and storage of their materials and equipment and execution of their work. The **Contractor** shall connect and coordinate its Work with theirs.

5.16.4. Coordination with Utility Companies. The **Contractor** shall coordinate its operations with all the appropriate utility companies to assure that the utilities required on the Project are available and functioning properly pursuant to the requirements of the Contract Documents.

5.17. Project Photographs. – section not required

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5.18. Record Documents and Samples at the Site.

5.18.1 The **Contractor** shall maintain in a safe place at the site one record copy of all Plans, Specifications, Modifications, Change Orders, **Construction Change** Directives, Field Orders and written interpretations and clarifications in good order and annotated to show all changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to the **Design Professional** for reference. Upon completion of the Work, these record documents, Samples and Shop Drawings will be delivered by the **Contractor** to the **Design Professional** for the **City**.

5.19. Submittals.

5.19.1. Purpose. The purpose of Submittals is to demonstrate for those portions of the Work for which Submittals are required the way the **Contractor** proposes to conform to the information given and the design concept expressed in the Contract Documents.

5.19.2. Submittal Procedure. Within ten (10) days from the Notice to Proceed, the **Contractor** shall submit to the **Design Professional** a completed Submittals schedule. The **Contractor** shall review, approve, and submit to the **Design Professional** Submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the **City** or of separate contractors. Submittals made by the **Contractor** that are not required by the Contract Documents may be returned without action. The schedules shall be updated and resubmitted each month. All Submittals will be identified as the **Design Professional** may require and in the number specified in the General Requirements. The 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 the **Design Professional** the materials and equipment that the **Contractor** proposes to provide and to enable the **Design Professional** to review the information for the limited purposes stated below.

5.19.3. Samples. The **Contractor** shall also submit Samples to the **Design Professional** for review and approval in accordance with said accepted schedule of Submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as the **Design Professional** may require to enable the **Design Professional** to review the Submittal for the limited purposed stated below. The numbers of each Sample to be submitted will be as specified in the Specifications. Unless otherwise specified in the Specifications, three (3) specimens of each Sample shall be submitted.

5.19.3.1. The Samples shall be of sufficient size to permit proper evaluation of material. Where variations in color or other characteristics are to be expected, samples showing the minimum range of variation shall be submitted. Materials exceeding the range of variation of the approved Samples will not be approved on the Work.

5.19.3.2. All costs associated with delivery of Samples will be paid by the **Contractor**.

5.19.4. Contractor's Verifications. Before submitting each Submittal, the **Contractor** shall have determined and verified:

5.19.4.1. all field measurements, quantities, dimensions specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

5.19.4.2. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

5.19.4.3. all information relative to the **Contractor's** sole responsibilities in respect of means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto.

5.19.5. Contractor's Representations. By approving and providing Submittals, the **Contractor** thereby represents that the **Contractor** has determined and verified all dimensions, quantities, field dimensions, relations to existing Work, coordination with Work to be installed later, coordination with information on previously accepted Submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the **Contractor**. In reviewing Submittals, the **Design Professional** shall be entitled to rely upon the **Contractor's** representation that such information is correct and accurate.

5.19.6. Coordination. The **Contractor** shall also have reviewed and coordinated each Submittal with other Submittals and with the requirements of the Work and the Contract Documents.

5.19.7. Stamp or Specific Written Indication. Each Submittal will bear a stamp or specific written indication that the **Contractor** has satisfied the **Contractor's** obligations under the Contract Documents with respect to the **Contractor's** review and approval of that Submittal.

5.19.8. Written Notice of Variations. At the time of each Submittal, the **Contractor** shall give the **Design Professional** specific written notice of such variations, if any, that the Submittal may have from the requirements of the Contract Documents. Such notice is to be in a written communication separate from the Submittal. Moreover, the **Contractor** shall make a specific notation on each Submittal to the **Design Professional** for review and approval of each such variation.

5.19.9. Review and Approval by the Design Professional. The **Contractor** shall perform no portion of the Work requiring a Submittal until the respective Submittal has been approved by the **Design Professional**. Such Work shall be in accordance with approved Submittals.

5.19.9.1. The **Design Professional** will review and approve Submittals in accordance with the schedule of Submittals accepted by the **Design Professional** as required above. The **Design Professional'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 in the Contract Documents. The **Design Professional's** review and approval will not extend to means, method, technique, sequences, or procedures of construction (except where a particular means, method, technique, sequences or procedures of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

5.19.10. Deviations. The **Contractor** shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the **Design Professional's** approval of Submittals unless the **Contractor** has specifically informed the **Design Professional** in writing of such deviation at the time of Submittal and the **Design Professional** has given written approval to the specific deviation. The **Contractor** shall not be relieved of responsibility for errors or omissions in Submittals by the **Design Professional's** approval thereof.

5.19.11. Revisions. The **Contractor** shall make corrections required by the **Design Professional** and shall return the required number of corrected copies of Submittals and submit as required new Submittals for review and approval. The **Contractor** shall direct specific attention, in writing or on resubmitted Submittals, to revisions other than those requested by the **Design Professional** on previous Submittals. Unless such written notice has been given, the **Design Professional's** approval of a resubmitted Submittal shall not constitute approval of any changes not requested on the prior Submittal.

5.19.12. Related Work. Where a Submittal is required by the Contract Documents or the schedule of Submittals accepted by the **Design Professional**, any related Work performed prior to the **Design Professional's** review and approval of the pertinent Submittal will be at the sole expense and responsibility of the **Contractor**.

5.19.13. Informational Submittals. Informational Submittals upon which the **Design Professional** is not expected to take responsive action may be so identified in the Contract Documents.

5.19.14. Certification. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the **City** shall be entitled to rely upon such certifications, and neither the **City** nor the **Design Professional** shall be expected to make any independent examination with respect thereto.

5.20. Continuing the Work.

5.20.1. The **Contractor** shall carry on the Work and adhere to the progress schedule

during all disputes or disagreements with the **City**. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as otherwise provided herein or as the **City** and the **Contractor** may agree in writing.

5.21. Use of Site; **Access to Work.**

5.21.1. The right of possession of the premises and the improvements made thereon by the **Contractor** shall remain at all times in the **City**. The **Contractor's** right to entry and use thereof arises solely from the permission granted by the **City** under the Contract Documents. The **Contractor** shall confine the **Contractor's** apparatus, the storage of materials, and the operations of the **Contractor's** workers to limits indicated by law, ordinance, the Contract Documents and permits and/or directions of the **Design Professional** and shall not unreasonably encumber the premises with the **Contractor's** materials. The **City** shall not be liable to the **Contractor**, the Subcontractors, Suppliers, or anyone else with respect to the conditions of the premises, except for a condition caused directly and solely by the negligence of the **City**.

5.21.2. At all times, the **City** and the **Design Professional** shall have access to the Work.

5.22. Protection of Persons and Property.

5.22.1. In General. The **Contractor** shall be responsible for initiating, maintaining, and supervising all health and safety precautions and programs in connection with the performance of the Contract. The **Contractor** is responsible for the implementation of all Federal, State, and local health and safety requirements.

5.22.2. The **Contractor** shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

5.22.2.1. employees on the site and other persons who may be affected thereby;

5.22.2.2. the Work, materials, and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the **Contractor**, Subcontractors, or Subsubcontractors-;

5.22.2.3. other property at the site or adjacent or in close proximity thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and

5.22.2.4. any other property of the **City**, whether or not forming part of the Work, located at the site or adjacent thereto in areas to which the **Contractor** has access.

5.22.3. Notices and Compliance. The **Contractor** shall give notices and comply in all other respects with applicable laws, ordinances, rules, regulations, codes, and lawful orders of

public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss. The **Contractor** shall notify owners of adjacent and nearby properties of underground facilities and utility owners when prosecution of the Work may affect them and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

5.22.4. Erection and Maintenance of Safeguards. The **Contractor** shall erect and maintain, as required by existing conditions and the terms of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent and nearby sites and utilities.

5.22.5. Hazardous Materials and Equipment. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the **Contractor** shall exercise utmost care and carry on such activities under the supervision of properly qualified personnel.

5.22.6. Damage to Property. The **Contractor** shall promptly remedy damage and loss to property referred to above. If the damage or loss is due in whole or in part to the **Contractor's** failure to take the precautions required herein, the **Contractor** shall bear the cost, subject to any reimbursement to which the **Contractor** is entitled under property insurance required by the Contract Documents. The **Contractor** shall be fully and solely responsible for all Work and other operations carried out on adjacent properties. The insurance required under Article 8 shall cover such Work or operations, and the **Contractor** shall indemnify and defend the **City**, the **Design Professional**, and the owners of such adjacent or nearby properties from and against all claims, suits, losses, or costs arising out of such Work or operations.

5.22.7. Fire Protection Equipment and Services. The **Contractor** shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean and all combustible rubbish shall be promptly removed from the site.

5.22.8. Protection of Excavations, Trenches, etc. The **Contractor** shall at all times protect excavations, trenches, buildings and materials from rain water, ground water, backup or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. The **Contractor** shall provide and operate all pumps, piping, and other equipment necessary to this end.

5.22.9. Snow and Ice Removal. The **Contractor** shall remove snow and ice that might result in damage or delay.

5.22.10. Safety Representative. The **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.

5.22.11. Weather Protection. (*Reference:* M.G.L. c. 149, §44F(1).) The **Contractor** shall install weather protection and furnish adequate heat in the protected area from November 1 through March 31.

5.22.12. Security. The **Contractor** shall provide, within the Contract Sum, a sufficient number of security personnel at the Site at all times when the **Contractor's** personnel are not present, from commencement of the Work until Substantial Completion to assure that the Site, the facility, and the Work, and all materials and equipment stored at the Site are fully and completely protected against loss or damage due to vandalism, theft, or malicious mischief. If the **Contractor** elects, in addition, to use guard dogs for this purpose, each dog shall at all times be accompanied by an adult handler. If the **Contractor** fails to comply with the requirements of this paragraph, then the **City** may provide appropriate security and charge the cost thereof to the **Contractor**. The **City's** provision of such security, or failure to do so, shall not relieve the **Contractor** of its responsibility to pay for loss or damage due to vandalism, theft, or malicious mischief at the Site.

5.22.13. Hazard Communication Programs. The **Contractor** shall be responsible for coordinating any exchange of material safety data sheets or other hazard communications information required to be made available to or exchanged between or among employers at the site in accordance with laws, codes and regulations.

5.22.14. Noise Pollution Control. The **Contractor** shall comply with all applicable provisions of Somerville Municipal Code §9-109.

5.23. Cutting and Patching.

5.23.1. In General. Unless otherwise provided in the Contract Documents, the **Contractor** shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly, including the work of the City or of separate contractors.

5.23.2. Damage to Work of City or of Separate Contractor. The **Contractor** shall not damage or endanger a portion of the Work or fully or partially completed construction of the **City** or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The **Contractor** shall not cut or otherwise alter such construction by the **City** or a separate contractor except with prior written consent of the **City** and of such separate contractor; such consent shall not be unreasonably withheld. The **Contractor** shall not unreasonably withhold from the **City** or a separate contractor the **Contractor's** consent to cutting or otherwise altering the Work.

5.23.3. Damage Caused by Contractor. Should the **Contractor** cause damage to the work or property of any separate contractor at the Site, or should any claim arising out of the **Contractor's** performance of Work at the Site be made by any separate contractor against the

Contractor, the **City**, the **Design Professional**, or any of the **Design Professional's** consultants, the **Contractor** shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. The **Contractor** shall, to the fullest extent permitted by laws and regulations, indemnify and hold harmless the **City**, the **Design Professional**, and the **Design Professional's** consultants from and against all claims, damages, losses and expenses (including, but not limited to, fees of the Design Professional, the Design Professional's consultants, attorneys, and other professionals, and court and arbitration or mediation costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any separate contractor against the **City**, the **Design Professional**, or any of the **Design Professional'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 the **Contractor** or should the performance of work by any separate contractor at the site give rise to any other claim, the **Contractor** shall not institute any action, legal or equitable, against the **City**, the **Design Professional**, or any of the **Design Professional'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 the **City**, the **Design Professional**, or any of the **Design Professional's** consultants, on account of any such damage or claim. If the **Contractor** delays at any time in performing or furnishing Work by any act or neglect of a separate contractor and the City and the Contractor are unable to agree as to the extent of any adjustment in the Contract Time attributable thereto, the **Contractor** may make a claim for an extension of time in accordance with Article 16. An extension of the Contract Time shall be the **Contractor's** exclusive remedy with respect to the **City**, the **Design Professional**, and the **Design Professional's** consultants, for any delay, disruption, interference, or hindrance caused by any separate contractor.

5.24. Cleaning Up.

5.24.1. During the progress of the Work, the **Contractor** shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract or other debris. At the completion of the Work, the **Contractor** shall remove from and about the Project all waste materials, rubbish, and debris, and the **Contractor's** tools, construction equipment, machinery, and surplus materials. Surplus materials to be provided to the **City** by specifications shall be stored in a clean, safe and secure area as directed by the **City**. The **Contractor** shall leave the site clean and ready for occupancy by the **City** at Substantial Completion of the Work. Immediately prior to the **Design Professional's** inspection for Substantial Completion, the **Contractor** shall completely clean the premises. Concrete and ceramic surfaces shall be cleaned and washed. Resilient coverings shall be cleaned, waxed and buffed. Woodwork shall be dusted and cleaned. Sash, fixtures and equipment shall be thoroughly cleaned. Stains, spots, dust, marks and smears shall be removed from all surfaces. Hardware and all metal surfaces shall be cleaned and polished. Glass and plastic surfaces shall be thoroughly cleaned by professional window cleaners. All damaged, broken or scratched glass or plastic shall be replaced by the **Contractor** at the **Contractor's** expense. The **Contractor** shall restore to original condition all property not designated for alteration by the Contract Documents.

5.24.2. If the **Contractor** fails to clean up as provided herein, the **City** may do so and charge the cost thereof to the **Contractor**.

5.25. Royalties and Patents.

5.25.1 The **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. To the fullest extent permitted by law, the **Contractor** shall indemnify and hold harmless the **City** and the **Design Professional** from and against all claims, costs, losses, and damages arising out of or resulting from 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.

5.26. Contractor's Obligation to Perform.

5.26.1. The **Contractor's** obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of the **Contractor's** obligation to perform the Work in accordance with the Contract Documents:

5.26.1.1. observations by the **Design Professional**;

5.26.1.2. recommendation of any progress or final payment by the **Design Professional**;

5.26.1.3. the issuance of a certificate of Substantial Completion or any

payment by the **City** to the **Contractor** under the Contract Documents;

5.26.1.4. use or occupancy of the Work, Project, or Site, or any part thereof, by the **City**;

5.26.1.5. any acceptance by the **City** or any failure to do so;

5.26.1.6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptance by the **Design Professional**;

5.26.1.7. any inspection, test, or approval by others; or

5.26.1.8. any correction of defective Work by the **City**.

5.27. Indemnification; **and Covenant Not To Sue.**

5.27.1. To the fullest extent permitted by law, the **Contractor** shall assume the defense of, indemnify and hold harmless the **City**, the **Design Professional**, the **Design Professional's** consultants, and agents and employees of any of them, from and against claims, damages, losses, and expenses, including, but not limited, to attorneys' fee, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting there from, caused in whole or in part by alleged negligent acts or omissions of the **Contractor**, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this paragraph.

5.27.2. In claims against any person or entity indemnified under the foregoing paragraph by an employee of the **Contractor**, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under the foregoing paragraph shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the **Contractor** or a Subcontractor under Workers' Compensation laws, disability benefit acts or other employee benefit acts.

5.27.3. The obligations of the **Contractor** in this Article shall not extend to the liability of the **Design Professional**, the **Design Professional's** consultants, and agents or employees of any of them arising out of (1) the preparation of maps, Plans, opinions, reports, surveys, Change Orders, designs, or Specifications, or (2) directions or instructions given by the **Design Professional**, the **Design Professional's** consultants and agents or employees of any of them, provided such instructions or directions are the primary cause of the injury or damage.

5.27.4. The **Contractor**, or any successor, assign, or subrogee of the **Contractor** agrees not to bring any civil suit, action, or other proceeding in law, equity or arbitration against the

Design Professional, or the officers, employees, agents, or consultants of the **Design Professional**, for the enforcement of any action which the **Contractor** may have arising out of or in any manner connected with the Work. The **Contractor** shall assure that this covenant not to sue is contained in all subcontracts and subsubcontracts- of every tier and shall assure its enforcement. The **Design Professional**, its officers, employees, agents, and consultants are intended thirdparty- beneficiaries of this covenant not to sue, and are entitled to enforce this covenant in law or equity.

5.28. Survival of Obligations.

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

ARTICLE 6: SUBCONTRACTORS

6.1 Use of Subcontractors.

6.1.1 The **Contractor** shall use the Subcontractors named in the **Contractor's** Bid.

6.2 Substitution of Subcontractors.

6.2.1 The **Contractor** shall not substitute another Subcontractor therefore without notice to the **City** and the **City's** prior written consent of such substitution.

6.3 Names of Subcontractors.

6.3.1 Upon execution of the Contract with the **City**, the **Contractor** shall provide in writing to the **City**, through the **Design Professional,** the names, addresses, telephone numbers, and fax numbers of all persons proposed for each principal portion of the Work.

6.4. Objections to Subcontractors.

6.4.1 The **Contractor** shall not use any Subcontractor against whom the **City** has a reasonable objection. The **Contractor** shall not be required to contract with any person or entity against whom it has a reasonable objection.

6.5. Form of the Subcontract.

6.5.1 All Work performed by a Subcontractor shall be through an appropriate subcontract. The form of subcontract shall be submitted to the **City's Law Department for its** approval, which shall not be unreasonably withheld or delayed.

6.6. Content of the Subcontract.

6.6.1. In addition to all statutorily mandated provisions and provisions required elsewhere in the Contract Documents, each subcontract shall expressly provide that:

6.6.1.1. Each subcontract agreement for a portion of the Work is assigned by the **Contractor** to the **City** provided that:

6.6.1.1.1. the assignment is effective only after termination of the Contract by the **City** or the **Contractor** and only for those subcontract agreements which the **City** accepts by notifying the Subcontractor in writing; and

6.6.1.1.2. the assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

6.6.1.2. Each Subcontractor is bound by the requirements of the Contract Documents for the express benefit of the **City.**

6.6.1.3. Each Subcontractor shall assume toward the **Contractor** all the obligations that the **Contractor** assumes toward the **City** and the **Design Professional**, unless otherwise provided by law.

ARTICLE 7: PERFORMANCE AND PAYMENT BONDS

7.1. Form of Bonds.

7.1.1 The performance and labor and material or payment bonds shall be in the form required by the **City**, copies of which are included in the Project Manual. The **City** reserves the right to reject any bond that does not conform to the **City's** requirements.

7.2. Furnished by the Contractor. (*Reference:* M.G.L. c. 30, §39M(c);, M.G.L. c. 149, §29).

7.2.1 The **Contractor** shall furnish a performance bond and a labor and materials or payment bond, each with a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the **City** and each in the sum of the Contract Sum, the premiums for which are to be paid by the **Contractor** and are included in the Contract Sum. The bonds shall remain in effect until final payment is made. The sum of the performance bond shall increase each time the Contract Sum is increased as a result of a Change Order.

7.3. Submission to the City.

7.3.1 The **Contractor** must submit the performance and a labor and materials or payment bonds to the **City** upon the **Contractor's** execution of the Agreement.

ARTICLE 8: INSURANCE REQUIREMENTS

8.1 Insurance Certificates.

8.1.1 Prior to starting work on this project, the contractor shall deposit with the **City**, certificates from insurers clearly stating that the required insurance policies have been issued to the **Contractor** and will remain in effect during the time period required to complete this contract. ACCORD forms will not be accepted. The certificates must be in a form satisfactory to the **City**. The insurance shall include all major divisions of coverage, and shall be on a comprehensive general basis including: Premises and Operations (including X-C-U), Owners and Contractors Protective, Products and Completed Operations, Owned, Non-owned or Hired and/or Leased Motor Vehicles. Such insurance shall be written for not less than any limits of liability, required by law or the following limits, whichever are greater.

8.2 Minimum Coverages. The **Contractor** shall possess and maintain throughout the contract period/project, insurance in the kinds and amounts as provided in Appendix D. The **Contractor** may purchase and maintain excess liability insurance in the in the umbrella form in order to satisfy the limits of liability required for the insurance to be purchased and maintained in accordance with the required requirements set forth above (in addition to the umbrella limits required). Evidence of such excess liability shall be delivered to the **City** in the form of a certificate and the certificate indicating the policy numbers and limits of liability of all underlying insurance.

8.3 Additional Insured. The **City and the Design Professional** shall be named as additional insureds on each certificate, and the certificate must have the endorsement of the insurance agency. The additional insured shall be a separate Owners Protective Liability policy providing Bodily Injury and Property Damage coverages. Each of the additional insureds shall have Bodily Injury coverage in the amount of $1,000,000 for each occurrence, and Property Damage coverage in the amount of $1,000,000 for each occurrence with an annual aggregate amount of $1,000,000.

8.4 Notice. Each certificate shall contain a notation that the insurer will give 30 days notice to the **City** prior to cancellation, change or non-renewal of policy.

8.5 Carrier Rating. Insurance carriers MUST have an A.M. Best rating of "A" or better.

8.6 Material Breach. Failure of the contractor to provide and continue in force such insurance shall be deemed a material breach of contract and shall operate as immediate termination thereof.

ARTICLE 9: TESTS AND INSPECTIONS

9.1. Access.

9.1.1 The **City**, the **Design Professional**, and all other persons designated by the **City** shall have access to the Work at reasonable times for observing, inspecting, and testing. The **Contractor** shall provide them with proper and safe conditions for such access and advise them of the **Contractor's** site safety procedures and programs so that they may comply therewith as applicable.

9.2. Tests and Inspections.

9.2.1. The **Contractor** shall give the **Design Professional** timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

9.2.2. Unless otherwise provided, the **Contractor** shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the **City**, or with the appropriate public authority and shall bear all related costs of tests, inspections, and approvals. If the 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, the **Contractor** shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith and furnish the **Design Professional** with the required certificates of inspection, testing, or approval.

9.2.3. The **Contractor** shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for the **Design Professional's** acceptance of materials or equipment to be incorporated into the Work, or of materials, mix designs, or equipment submitted for approval prior to the **Contractor's** purchase thereof for incorporation into the Work.

9.2.4. If any Work that is to be inspected, tested, or approved is covered by the **Contractor**, Subcontractor, or Subsubcontractor- without the prior written consent of the **Design Professional**, it must be uncovered for observation, inspection, testing, or approval, if requested by the **Design Professional**. The **Contractor** must recover the Work at its own expense.

9.2.5. The **Contractor** shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the **Design Professional** in the **Design Professional's** administration of the Contract or by tests, inspections, or approvals required or performed by persons other than the **Contractor**.

ARTICLE 10
UNCOVERING AND CORRECTING WORK

10.1. Uncovering Work.

10.1.1. If a portion of the Work is covered contrary to the **Design Professional's** request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the **Design Professional**, be uncovered for the **Design Professional's** observation and be replaced, both at the **Contractor's** expense and without change in the Contract Time.

10.1.2. If a portion of the Work has been covered which the **Design Professional** has not specifically requested to observe prior to its being covered, the **Design Professional** may request to see such Work, and it shall be uncovered by the **Contractor**. If it is found that such Work is in accordance with the Contract Documents, costs of uncovering and replacing shall, by appropriate Change Order, be charged to the **City**. If it is found that such Work is defective or not in accordance with the Contract Documents, the **Contractor** shall pay all claims, costs, losses, and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection, and testing and of satisfactory replacement of reconstruction (including, but not limited to, all costs of repair or replacement of work of others); and the **City** shall be entitled to an appropriate decrease in the Contract Sum. The **City** may take such decrease by reducing the then current application for payment accordingly or subsequent applications, if necessary, until the decrease is paid in full.

10.2. Correcting Work.

10.2.1. The **Contractor** shall promptly correct Work rejected by the **Design Professional** or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. The **Contractor** shall bear all costs of correcting such rejected Work including additional testing and inspections and compensation for the **Design Professional's** services and expenses made necessary thereby and any cost, loss, or damages to the **City** resulting from such failure or defect.

10.2.2. If, within one (1) year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established in Article 15, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the **City** to do so, unless the **City** has previously given the **Contractor** a written acceptance of such condition. This period of one (1) year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation to correct under this paragraph shall survive acceptance of the Work under the Contract and termination of the Contract. The **City** shall give such notice promptly after discovery of the condition.

10.2.3. The **Contractor** shall correct, remove, or replace portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the **Contractor** nor accepted by the **City**.

10.2.4. If the **Contractor** fails within a reasonable time to correct nonconforming Work, or to remove and replace rejected Work, or fails to perform the Work in accordance with the Contract Documents, the **City** may correct it in accordance with the provisions herein. If the **Contractor** does not proceed with correction, removal, or replacement of such nonconforming Work within seven (7) days from the date of written notice from the **Design Professional**, the **City** may correct it and store any salvageable materials or equipment at the **Contractor's** expense. If the **Contractor** does not pay costs of any such removal and storage within ten (10) days after written notice, the **City** may upon ten (10) additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the **Contractor**, including compensation for the **Design Professional's** services and expenses made necessary thereby. If such proceeds of sale do not cover all the costs that the **Contractor** should have born, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the **Contractor** are not sufficient to cover such amount, the **Contractor** shall pay the difference to the **City**.

10.2.5. The **Contractor** shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the **City** or separate contractors

caused by the **Contractor's** correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

10.2.6. Nothing contained in this paragraph shall be construed to establish a period of limitation with respect to other obligations that the **Contractor** might have under the Contract Documents. Establishment of the time period of one (1) year as described in the above paragraph related only to the specific obligation of the **Contractor** to correct the Work and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced nor to the time within which proceedings may be commenced to establish the **Contractor's** liability with respect to the **Contractor's** obligations other than specifically to correct the Work.

10.3. Acceptance of Nonconforming Work.

10.3.1 If, instead of requiring correction or removal and replacement of defective or nonconforming Work, the **City** prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the **City** may do so instead of requiring its removal and correction, in which case the **Contractor** shall pay all claims, costs, losses, and damages attributable to the **City's** evaluation of and determination to accept such defective or non-conforming Work. The Contract Sum will be reduced as appropriate. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 11:CHANGES IN THE WORK

11.1. In General.

11.1.1. The Contract Sum constitutes the total compensation (subject to authorized adjustments) payable to the **Contractor** for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the **Contractor** shall be at the **Contractor's** expense without any change in the Contract Sum.

11.1.2. Without invalidating the Contract and without notice to any surety, the **City** may, at any time or from time to time, order additions to, deletions from, or revisions in the Work. Such additions, deletions, or revisions will be authorized by a Change Order, a Modification or a **Construction Change** Directive. Upon receipt of any such document, the **Contractor** shall promptly proceed with the Work involved that will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

11.1.3. The **Contractor** shall not be entitled to an increase in the Contract Sum or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified, or supplemented, except as otherwise provided herein.

11.2. Change Orders.

11.2.1. (*Reference:* M.G.L. c. 30, §39I;). The **Contractor** shall perform all the Work required by this Contract in conformity with the Plans and Specifications contained herein. No willful and substantial deviation from said Plans and Specifications shall be made unless

authorized in writing by the **City** and the **Design Professional** in charge of the Work who is duly authorized by the **City** to approve such deviations. In order to avoid delays in the prosecution of the Work required by such Contract, such deviation from the Plans or Specifications may be authorized by a written order of the **City** or the **Design Professional** so authorized to approve such deviation. Within thirty (30) days thereafter, such written order shall be confirmed by a certificate of the **City** stating: (1) If such deviation involves any substitution or elimination of materials, fixtures or equipment, the reasons why such materials, fixtures, or equipment were included in the first instance and the reasons for substitution or elimination, and, if the deviation is of any other nature, the reasons for such deviation, giving justification therefore; (2) that the specified deviation does not materially injure the Project as a whole; (3) that either the work substituted for the Work specified is of the same cost and quality, or that an equitable adjustment has been agreed upon between the **City** and the **Contractor** and the amount in dollars of said adjustment; and (4) that the deviation is in the best interest of the **City**.

11.3. Construction Change Directive.

11.3.1. A **Construction Change** Directive shall be used in the absence of total agreement on the terms of a Change Order.

11.3.2. Upon request of the **City** or the **Design Professional**, the **Contractor** shall without cost to the **City** submit to the **Design Professional** in such form as the **Design Professional** may require, an accurate written estimate of the cost of any 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 **Design Professional**. If required by the **Design Professional**, in order to establish the exact cost of new Work added or of previously required Work omitted, the **Contractor** shall obtain and furnish to the **Design Professional** bona fide proposals from recognized Suppliers for furnishing any material included in such Work. Such estimates shall be furnished promptly so as to occasion no delay in the Work, and shall be furnished at the **Contractor's** expense.

11.3.3. 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. The **Contractor** shall document, through a critical path analysis, or some other clearly delineated explanation, how the proposed change affects other aspects of the Work, and why it would require an extension of time. The **Contractor** shall promptly revise and resubmit such estimate if the **Design Professional** determines that it is not in compliance with the requirements of this Article, or that it contains errors of fact or mathematical errors.

11.3.4. If the **Construction Change** Directive provides for an adjustment to the Contract Sum**,** the adjustment shall be based on one of the following methods, as selected by the **City**, selection of which does not require the consent of the **Contractor**:

11.3.4.1. by unit prices stated in the Contract Documents or otherwise mutually

agreed upon; or

11.3.4.2. by Cost and Percentages estimated by the **Contractor** as provided herein and accepted by the **City**, whereupon the **Contractor's** estimate shall become a fixed price which shall not be changed by any variation in the actual cost of executing the Work covered by the change; or

11.3.4.3. by actual Cost determined after the Work covered by the change is completed, plus Percentage; or

11.3.4.4. by submission to arbitration or a court, which shall determine the fair value of the Work covered by the change.

11.3.5. "Cost" shall mean the estimated or actual net increase or decrease in cost to the **Contractor**, Subcontractor, or Subsubcontractor- for performing the Work covered by the change, including actual payments for materials, equipment rentals, expendable items, wages, and associated benefits to the workers and to supervisors employed full time at the Site, insurance, bonds, and other provable direct costs, but not including any administrative, accounting or expediting costs, or other indirect or overhead costs, or any wages or benefits of supervisory personnel not assigned full time to the Site, or any amount for profit or fee to the **Contractor**, Subcontractor, or Subsubcontractor-.

11.3.6. "Percentage" shall mean an allowance to be added to or subtracted from the Cost in lieu of overhead and profit and of any other expense that is not included in the Cost of the Work covered by the change, as defined above. Percentage for a Subsubcontractor- shall be 8% of any net increase or decrease of Cost of any Work performed by the Subsubcontractor's own forces plus 4% of any net increase or decrease in Cost of any Work performed for the -Subsubcontractor by lower tier -Subsubcontractors-. Percentage for a Subcontractor shall be 12% of any net increase or decrease of Cost of any Work performed by the Subcontractor's own forces plus 4% of the Cost of Work performed by Subsubcontractors-. Percentage for the **Contractor** shall be 15% of any net increase or decrease of Cost of any Work performed by the **Contractor's** own forces plus 5% of any net increase or decrease in the Cost for all other Work covered by the change. When the **Contractor** is also performing Work as a Subcontractor or Subsubcontractor-, the **Contractor** shall only be entitled to a total of no more than 15% of any net increase or decrease of Cost of any Work.

11.3.7. When in the reasonable judgment of the **Design Professional** a series of **Construction Change** Directives or Change Orders effect a single change, Percentage shall be calculated on the cumulative net increase or decrease in Cost, if any.

11.3.8. If unit prices are stated in the Contract Documents or are subsequently agreed upon, and if quantities originally contemplated are so changed in a Proposed Change Order or **Construction Change** Directive that the application of such unit prices to quantities of Work proposed will cause substantial inequity to the **City** or the **Contractor**, the applicable unit prices

shall be equitably adjusted.

11.3.9. If the **City** elects to determine the Cost of the Work as provided in method (11.3.4.1) using unit prices stated in the Contract Documents or subsequently agreed upon, the unit prices shall be subject to the prior paragraph. Notwithstanding the inclusion of unit prices in the Contract Documents, it shall be the **City's** option to require the Cost of any given change to be determined by one of the other methods stated in 11.3.4. If the **City** elected to determine the Cost of the change by unit prices and the nature of the work is such that its extent cannot readily be measured after the completion of such work or any subsequent Work, the **Contractor** shall keep daily records, available at all times to the **Design Professional** for inspection, of the actual quantities of such Work put in place, and delivery receipts or other adequate evidence, acceptable to the **Design Professional**, indicating the quantities of materials delivered to the Site for use in such unit price Work, and distinguishing such from other similar material delivered for use in Work include in the base Contract Sum. If so required by the **Design Professional**, materials for use in unit price Work shall be stored apart from all other materials on the Project.

11.3.10. If the **City** elects to determine the Cost of the Work as provided in methods 11.3.4.3. or 11.3.4.4. or if the method of determining the Cost has not been established before the Work is begun, the **Contractor** shall keep detailed daily records of labor and material costs applicable to the Work.

11.3.11. Upon receipt of a **Construction Change** Directive, the **Contractor** shall promptly proceed with the change in the Work involved and advise the **Design Professional** in writing of the **Contractor's** agreement or disagreement with the method, if any, provided in the **Construction Change** Directive for determining the proposed adjustment in the Contract Time.

11.3.12. A **Construction Change** Directive signed by the **Contractor** indicates the agreement of the **Contractor** therewith, including adjustment in the Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

11.3.13. If the **Design Professional** and the **Contractor** do not agree with the adjustment in the Contract Time or the method for determining it, the adjustment or the method shall be referred to the **Design Professional** for determination.

11.4. Minor Changes in the Work.

11.4.1. The **Design Professional** has the authority to order minor changes in the Work. “Minor changes” as used in this paragraph mean changes which are so insignificant as to not affect the Contract Sum or the Contract Time and which are not inconsistent with the intent of the Contract Documents. Any minor change shall be committed to a written order which shall be binding on both the **City** and the **Contractor** and which shall be promptly carried out by the **Contractor**.

11.5. Certificate of Appropriations. (*Reference:* M.G.L. c. 44, §31C;). This Contract shall not be deemed to have been made until the **City's** auditor has certified thereon that an appropriation in the amount of this Contract is available therefor and that an officer or agent of the **City** has been authorized to execute said Contract and approve all requisitions and change orders. No order to the **Contractor** for a change in or addition to the Work, whether in the form of a drawing, plan, detail or any other written instruction, unless it is an order which the **Contractor** is willing to perform without any increase to the Contract price, shall be deemed to be given until the auditor has certified thereon that an appropriation in the amount of such order is available therefore; but such certificate shall not be construed as an admission by the **City** of its liability to pay for such work. The certificate of the auditor that an appropriation in the amount of this Contract or in the amount of such order is available shall bar any defense by the **City** on the grounds of insufficient appropriation.

ARTICLE 12: CHANGE IN THE CONTRACT TIME

12.1. Date of Commencement.

12.1.1 The date of commencement of the Work is the date established in the Notice to Proceed. The date shall not be postponed by the failure to act of the **Contractor** or persons or entities for whom the **Contractor** is responsible.

12.2. Progress and Completion.

12.2.1. Time is of the essence; all time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the **Contractor** confirms that the Contract Time is a reasonable period for performing the Work.

12.2.2. The **Contractor** shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

12.2.3. Within five (5) working days of award of contract, the **Contractor** shall submit to the **Design Professional** a progress schedule showing for each class of Work included in the schedule of values, the percentage of completion to be obtained and the total dollar value of Work to be completed as of the first of each month until Substantial Completion. All calculations shall be on the basis of Work in place, but may include, at the **Design Professional's** discretion, the value of materials delivered but not in place.

12.2.4. The progress schedule shall be based on an orderly progression of the Work, allowing adequate time for each operation (including adequate time for submission and review of submittals), and leading to a reasonable certainty of Substantial Completion by the date established in the Agreement. The progress schedule will be reviewed by the **Design Professional** for compliance with the requirements of this Article and will be accepted by the **Design Professional** or returned to the **Contractor** for revision and resubmittal. Unless specifically required by law, no payment under this Contract shall be due until the progress schedule has been approved by the **Design Professional**. The **Design Professional's** review of the progress schedule shall not impose any duty on the **Design Professional** or the **City** with respect to the timing, planning, scheduling, or execution of the Work. In particular, if the

Contractor proposes a progress schedule indicating a date of Substantial Completion which is earlier than the Contract Time, the **Contractor** shall not be entitled to additional payment or compensation of any kind if, for any reason, the full Contract Time is required to achieve Substantial Completion of the Work.

12.2.5. If in any Application for Payment, the total value of the completed Work in place, as certified by the **Design Professional**, is less than 90% of the total value of the Work in place estimated in the progress schedule, the **City** may, at the **City's** option, require the **Contractor** to accelerate the progress of the Work without cost to the **City** by increasing the workforce or hours or Work or by other reasonable means approved by the **Design Professional**.

12.2.6. If each of three successive applications, as certified by the **Design Professional**, indicate that the actual Work completed is less than 90% of the values estimated in the progress schedule to be completed by the respective dates, the **City** may at the **City's** option, treat the **Contractor's** delinquency as a default justifying the action permitted under Article 18.

12.2.7. If the **Design Professional** has determined that the **Contractor** should be permitted to extend the time for completion as provided below, the calendar dates in the progress schedule shall be adjusted accordingly to retain their same relationship to the adjusted date of Substantial Completion, and the dollar value of the Work to be completed as of the first of each month shall be adjusted pro rata.

12.2.8. If the **Contractor** fails to submit any application for payment in any month, the **Design Professional** shall, for the purpose of this evaluation of progress, certify separately to the actual value of the Work in place completed as of the first of the month to the best of the **Design Professional's** knowledge.

12.2.9. Nothing herein shall limit the **City's** right to liquidated or other damages for delays by the **Contractor** or to any other remedy which the **City** may be entitled or may possess under other provisions of the Contract Documents or by law.

12.3. Delays and Extensions of Time.

12.3.1. If the **Contractor** is delayed at any time in the progress of the Work by an act or neglect of the **City** or the **Design Professional**, or of an employee of either, or of a separate contractor employed by the **City**, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes (except weather) beyond the **Contractor's** control, or by delay authorized by the **City**, or by other causes which the **Design Professional** determines may justify delay, then the Contract Time shall be extended by Change Order or **Construction Change** Directive for such reasonable time as the **Design Professional** may determine.

12.3.2. Claims relating to time shall be made in accordance with applicable provisions of Article 16.

12.3.3. No claim for extension of time shall be allowed on account of failure of the **Design Professional** to furnish Plans, Specifications or instructions or to return Shop Drawings or Samples until fifteen (15) days after receipt by the **Design Professional** by registered or certified mail of written demand for such instructions, Plans, Specifications, or Samples, and then not unless such claim is reasonable.

12.3.4. No extensions of time shall be granted because of seasonal or abnormal variations in temperature, humidity or precipitation, which conditions shall be wholly at the risk of the **Contractor**, whether occurring within the time originally scheduled for completion or within the period of any extension granted. There shall be no increase in the Contract Sum on account of any additional costs of operations or conditions resulting therefrom.

12.3.5. The **Contractor** hereby agrees that the **Contractor** shall have no claim for damages of any kind against the **City** or the **Design Professional** on account of any delay in the commencement of the Work and/or any hindrance, delay, or suspension of any portion of the Work, whether such delay is caused by the **City**, the **Design Professional**, or otherwise, except as and to the extent expressly provided under M.G.L. c. 30, §39O, in the case of written orders by the **City**. The **Contractor** acknowledges that the **Contractor's** sole remedy for any such delay and/or suspension will be an extension of time as provided in this Article.

12.3.6. (*Reference:* M.G.L. c. 30, §39O;). (a) The **City** may order the **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 **City**, provided however that if there is a suspension, delay, or interruption for fifteen (15) days or more due to a failure of the **City** to act within the time specified in this Contract, the **City** shall make an adjustment in the Contract prices for any increase in the cost of performance of this Contract 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 **Contractor** must submit the amount of a claim under provision (a) to the **City** 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 **City** shall not approve any costs in the claim incurred more than twenty (20) days before the **Contractor** notified the **City** in writing of the act or a failure to act involved in the Claim.

In the event a suspension, delay, interruption, or failure to act of the **City** increases the cost of performance to any Subcontractor, that Subcontractor shall have the same rights against the **Contractor** for payment for an increase in the cost of its performance as provisions (a) and (b) give the **Contractor** against the **City**, but nothing in provisions (a) and (b) shall in any way change, modify, or alter any other rights which the **Contractor** or the Subcontractor may have against each other.

12.4. Liquidated Damages.

12.4.1. If the **Contractor** shall fail to achieve Substantial Completion within the Contract Time, it shall be liable to pay the **City** the daily amount specified in the Agreement, not as a penalty, but as a fixed and agreed upon damages for breach of contract. The said amount is fixed and agreed upon because of the difficulty of ascertaining the **City's** actual damages. It is mutually understood that the said amount is a reasonable approximation or estimate thereof as of the date of the Agreement. The **City** may elect to withhold said amount from periodic or final payments due to the **Contractor**, in addition to retainage and other back charges.

12.5. Changes in the Contract Time.

12.5.1. In Writing. The Contract Time may only be changed by a Change Order or a Modification. Any claim for an adjustment of the Contract Time shall be based on a written notice delivered to the party making the claim to the other party and to the **Design Professional** promptly (but in no event later that seven (7) days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within thirty (30) days after such occurrence and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by the **Design Professional** in accordance with Article 16. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph.

12.5.2. Early Completion. The Contract Time shall not be changed due to a delay in the **Contractor's** early completion date.

ARTICLE 13: PAYMENTS

13.1. Schedule of Values.

13.1.1. The **Contractor** shall submit to the **Design Professional** a schedule of values which shall subdivide the Work into its component parts and shall include quantities, direct craft labor worker hours, labor cost and material/equipment cost. Labor cost shall include an appropriate amount of construction equipment costs, supplemental costs, administrative expenses, contingencies, and profit. The **Contractor** shall prepare the schedule of values in such form and supported by such data to substantiate its accuracy as the **Design Professional** may require and shall be revised if later found by the **Design Professional** to be inaccurate. This schedule, unless objected to by the **Design Professional**, shall be used as a basis for reviewing the **Contractor's** applications for payment.

13.2. Content and Submission of Applications for Payment.

13.2.1. At least ten (10) days before the date established for each progress payment, the **Contractor** shall submit to the **Design Professional** six (6) copies of an itemized application for payment for Work completed in accordance with the schedule of values. Such application shall be in a form or format established or approved by the **Design Professional** and shall be

supported by documentation substantiating the **Contractor's** right to payment.

13.2.2. When **Construction Change** Directives have set forth an adjustment to the Contract Sum but have not yet been included in Change Orders, the value established by the **City** may be included in the application.

13.2.3. Applications covering Work of Subcontractors or Suppliers shall not include requests for payments of amounts the **Contractor** does not intend to pay to a Subcontractor or Supplier because of a dispute or other reason. The **Contractor** shall not be paid for any Work performed by a Subcontractor unless and until the **City** receives for that Subcontractor a certificate of insurance that conforms to the requirements of the Contract Documents .

13.2.4. Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the Site for subsequent incorporation in the Work. If approved in advance by the **City**, payment may similarly be made for materials and equipment suitably stored off the Site at a location agreed upon in writing. Payment for materials and equipment stored on or off the Site shall be conditioned upon the application for payment being accompanied by a bill of sale, an invoice, or other documentation warranting that the **City** has received the materials and equipment free and clear of all liens, claims, security interests, or encumbrances, hereinafter collectively referred to as "liens," and evidence that the materials and equipment are covered by appropriate insurance and other arrangements to protect the **City's** interest therein.

13.2.5. Each application for payment or periodic estimate requesting payment shall be accompanied by, at the **City's** option, a certificate from each Subcontractor stating that the Subcontractor has been paid all amounts due the Subcontractor on the basis of the previous periodic payment to the **Contractor**, or else stating the amount not so paid and the reason for the discrepancy. In the event of any such discrepancy, the **Contractor** shall furnish the **Contractor's** own written explanation to the **City** through the **Design Professional**. Such waiver or certificate shall be in a form acceptable to the **City**.

13.3. False Applications for Payment.

13.3.1. (*Reference:* M.G.L. c. 266, §§67B). Any person who makes or presents to any claim upon or against any employee or department of the **City**, knowing such claim to be false, fictitious, or fraudulent shall be punished by a fine or not ore than ten thousand dollars ($10,000) or by imprisonment in the state prison for not more than five (5) years, or in the house of correction for not more than two and one-half years, or both.

13.4. Review of Applications for Payment.

13.4.1. The **Design Professional** shall review each application for payment and will reject any application that (1) is not accompanied by the required documentation or (2) contains errors, mathematical or otherwise.

13.4.2. Within five (5) business days after receipt of an application for payment, the

Design Professional will either (1) return the application to the **Contractor** with a written explanation as to why it was rejected or (2) issue to the **City** a certificate for payment, with a copy to the **Contractor**, for such amount as the **Design Professional** determines is properly due. In the event an application is returned to the **Contractor**, the date of receipt of the application shall be the date of receipt of the corrected application.

13.4.3. The **Design Professional** or the **City** may make changes to any application submitted by the **Contractor**.

13.4.4. By recommending any payment, the **Design Professional** will not thereby be deemed to have represented that: (1) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to the **Design Professional** in the Contract Documents or (2) that there may not be other matters or issues between the parties that might entitle the **Contractor** to be paid additionally by the **City** or entitle the **City** to withhold payment to the **Contractor**. The **Design Professional's** approval of the application for payment and the accompanying documentation shall indicate that to the best of the **Design Professional's** knowledge, information, and belief, the Work has progressed to the point indicated by the **Contractor**, and that the quality of the Work is 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 specified in the Contract Documents, final determination of quantities and classifications for unit price work and any other qualifications so stated.

13.4.5. The **Design Professional's** recommendation of any payment shall not mean that the **Design Professional** is responsible for the **Contractor's** means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the **Contractor** to comply with laws and regulations applicable to the furnishing or performance of Work, of for any failure of the **Contractor** to perform or furnish Work in accordance with the Contract Documents.

13.4.6. No certificate given or payment made shall be evidence of the performance of this Contract, either wholly or in part and no payment, whether made upon the final certificate or otherwise, shall be construed as an acceptance of defective work or materials.

13.5. Decisions to Withhold Certification.

13.5.1. The **Design Professional** may refuse to recommend the whole or any part of any payment if, in the **Design Professional's** opinion, it would be incorrect to make the representations to the **City** referred to above.

13.5.2. If the **Contractor** and the **Design Professional** cannot agree on a revised amount, the **Design Professional** will promptly approve a certificate for payment for the amount for which the **Design Professional** is able to make such representations to the **City**. The **Design Professional** may also decide not to certify payment or, because of subsequently discovered

evidence or subsequent observations, may nullify the whole or a part of a certificate for payment previously issued, to such extent as may be necessary in the **Design Professional's** opinion to protect the **City** from loss because of:

13.5.2.1. defective Work not remedied;

13.5.2.2. third party claims filed or reasonable evidence indicating probable filing of such claims;

13.5.2.3. failure of the **Contractor** to make payments properly to Subcontractors or for labor, materials or equipment;

13.5.2.4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

13.5.2.5. damage to the **City** or another contractor;

13.5.2.6. reasonable evidence that the Work will not be completed within the Contract Time, and that retainage currently held by the **City** would not be adequate to cover actual or liquidated damage for the anticipated delay;

13.5.2.7. persistent failure to carry out the Work in accordance with the Contract Documents; or

13.5.2.8. failure of mechanical trade or electrical trade subcontractors to comply with mandatory requirements for maintaining record drawings. The **Contractor** shall check record drawings each month. Written confirmation that the record drawings are current will be required by the **Design Professional** before approval of the **Contractor's** monthly payment requisition.

13.5.3. When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

13.6. Progress Payments.

13.6.1. After the **Design Professional** has issued a certificate for payment, the **City** shall make payment in the manner and within the time provided in the Contract Documents.

13.6.2. (*Reference:* M.G.L. c. 30, §39G;). The **City** shall pay the amount due pursuant to any periodic, Substantial Completion or final estimate within thirty-five (35) days after receipt of written acceptance for such estimate from the **Contractor**. In the case of periodic payments, the **City** may deduct from its payment a retention based on its estimate of the fair value of its claims against the **Contractor**, a retention for direct payments to Subcontractors based on demands for

same in accordance with M.G.L. c. 30, §39F; and a retention to secure satisfactory performance of the contractual work, not exceeding five percent (5%) of the approved amount of any periodic payment, and the same right to retention shall apply to bonded Subcontractors entitled to direct payment under M.G.L. c. 30, §39F; provided, that a five percent (5%) value of all items that are planted in the ground shall be deducted from the periodic payments until final acceptance.

13.6.3. No periodic, Substantial Completion or final estimate or acceptance or payment thereof shall bar the **Contractor** from reserving all rights to dispute the quantity and amount of, or the failure of the **City** to approve a quantity and amount of, all or part of any Work item or extra Work item.

13.7. Final Payment.

13.7.1. After final inspection and after the **Contractor** has completed all the required corrections to the satisfaction of the **Design Professional** and the **City** and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, bonds, certificates, or other evidence of insurance, certificates of inspection, marked up record documents, and all other documents called for in the Contract Documents, as well as any surplus materials requested by the **City,** the **Contractor** may make an application for final payment as provided below.

13.7.2. (*Reference:* M.G.L. c. 30, §39G;). Within thirty (30) days after receipt by the **City** of a notice from the **Contractor** stating that all of the Work required by the Contract has been completed, the **City** shall prepare and forthwith send to the **Contractor** for acceptance a final estimate for the quantity and price of the Work done and all retainage on the Work less all payments made to date, unless the **City's** inspection shows that Work required by the Contract remains incomplete or unsatisfactory, or that documentation required by the Contract has not been completed.

13.7.3. The making and acceptance of final payment will constitute a waiver of all claims by the **Contractor** against the **City** other than those previously made in writing and still unsettled.

13.8. Payments to Subcontractors.

13.8.1. Neither the **City** nor the **Design Professional** shall have an obligation to pay or see to the payment of money to a Subcontractor, Subsubcontractor-, or Supplier except as may otherwise be required by law.

13.8.2. (*Reference:* M.G.L. c. 30, §39F;) (1)(a) Forthwith after the **Contractor** receives payment on account of a periodic estimate, the **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 **Contractor**.

(b) Not later than the sixty fifth day after each Subcontractor substantially completes its Work in accordance with the Plans and Specifications, the entire balance due under the subcontract, less amounts retained by the **City** as the estimated cost of completing the incomplete and unsatisfactory items of Work, shall be due the Subcontractor; and the **City** shall pay that amount to the **Contractor**. The **Contractor** shall forthwith pay to the Subcontractor the full amount received from the **City** less any amount specified in any court proceeding barring such payment and also less any amount claimed due from the Subcontractor by the **Contractor**.

(c) Each payment made by the **City** to the **Contractor** pursuant to paragraphs (a) and (b) of M.G.L. c. 30, §39F(1);, for the labor performed and the materials furnished by a Subcontractor shall be made to the **Contractor** for the account of that Subcontractor; and the **City** shall take reasonable steps to compel the **Contractor** to make each such payment to each such Subcontractor. If the **City** has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the **Contractor** or which is to be include in a payment to the **Contractor** for payment to the Subcontractor as provided in paragraphs (a) and (b) of M.G.L. c. 30, §39F(1), the **City** shall act upon the demand as provided in M.G.L. c. 30, §39F.

(d) If, within seventy (70) days after the Subcontractor has substantially completed the subcontract Work, the Subcontractor has not received from the **Contractor** the balance due under the subcontract including any amount due for extra labor and materials furnished to the **Contractor**, less any amount retained by the **City** as the estimated cost of completing the incomplete and unsatisfactory items of Work, the Subcontractor may demand direct payment of that balance from the **City**. The demand shall be by a sworn statement delivered to or sent by certified mail to the **City**, and a copy shall be delivered to or sent by certified mail to the **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. [The demand letter shall indicate the certified mail number assigned by the postal service or the date of delivery to the **Contractor**.] 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 (10) days after the Subcontractor has delivered or so mailed the demand to the **City** and delivered or so mailed a copy to the **Contractor**, the **Contractor** may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the **City**, 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 **Contractor** and of the amount due for each claim made by the **Contractor** against the Subcontractor.

(e) Within fifteen (15) days after receipt of the demand by the **City**, but in no event prior to the seventieth day after substantial completion of the subcontract Work, the **City** 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 **Contractor**, less any amount (i) retained by the **City** 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 **Contractor** in the sworn reply; provided that the **City** 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 the previous paragraph. The **City** 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 paragraph.

(f) The **City** shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of the previous paragraph in an interestbearing- joint account in the names of the **Contractor** and the Subcontractor in a bank in Massachusetts selected by the **City** or agreed upon by the **Contractor** and the Subcontractor and shall notify the **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 **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 interestbearing- account or accounts in a bank pursuant to the previous paragraph shall be made out of amounts payable to the **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 **Contractor** and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the **City** to the **Contractor** to the extent of such payment.

(h) The **City** shall deduct from payments to a **Contractor** amounts that, together with the deposits in interestbearing- accounts pursuant to paragraph (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 **Contractor**.

(i) If the Subcontractor does not receive payment as provided in paragraph (a) or if the **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 paragraph (a), the Subcontractor may demand direct payment by following the procedure in paragraph (d) and the **Contractor** may file a sworn reply as provided in that same paragraph. 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 **Contractor**. Thereafter the **City** shall proceed as provided in paragraphs (e), (f), (g), and (h). "Subcontractor" as used in this paragraph (1)(i) shall mean a person approved by the **City** in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the **Contractor**.

(2) Any assignment by a Subcontractor of the rights under this section to a surety company furnishing a bond under the provisions of M.G.L. c. 149, §29; 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 **City** or which are on deposit pursuant to paragraph (g) 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) A **Contractor** or a Subcontractor shall enforce a claim to any portion of the amount of a demand for direct payment deposited as provided in herein 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 paragraph (f) by a petition in equity in the superior court against the **City** and the **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. M.G.L. c. 231, §§59 and 59B 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 §§59 and 59B 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 that 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 present 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 **Contractor** are available for direct payment shall have a right to file a petition in court of equity against the **City** claiming a demand for direct payment is premature, and such Subcontractor must file the petition before the **City** has made a direct payment to the Subcontractor and has made a deposit of the disputed portion as provided in part (iii) of paragraph (e) and in paragraph (f).

(4) 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 **Contractor**, reduce by the amount of any deposit of a disputed amount by the **City** as provided in part (iii) of

paragraph (e) and in paragraph (f) any amount held under a trustee writ or pursuant to a restraining order or injunction.

ARTICLE 14: SUBSTANTIAL COMPLETION

14.1. Substantial Completion.

14.1.1. Upon Substantial Completion of the Work, the **Contractor** shall present in writing to the **City** its certification that the Work has been substantially completed and include in its certification (1) a list of items to be completed or corrected, (2) all special warranties required by the Contract Documents, endorsed by the **Contractor** and in a form reasonably acceptable to the **Design Professional** and (3) the permits and certificates referred to in 13.7.1., or elsewhere. The failure to include any item on the list mentioned in the preceding sentence does not alter the responsibility of the **Contractor** to complete all Work in accordance with the Contract Documents. When the **Design Professional** on the basis of an inspection determines that the Work or designed portion thereof is substantially complete and the other conditions have been met, the **Design Professional** will then prepare a certificate of Substantial Completion which shall establish the date of Substantial Completion, shall state the responsibilities of the **City** and the **Contractor** for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the **Contractor** shall complete the items listed therein. The certificate of Substantial Completion shall be submitted to the **City** and the **Contractor** for their written acceptance of the responsibilities assigned to them in such certificate.

14.1.2. Within twenty one (21) days after receipt of the certification from the **Contractor**, the **City** shall present to the **Contractor** either a written declaration that the Work has been substantially completed or an itemized list of incomplete or unsatisfactory work items required by the Contract sufficient to demonstrate that the Work has not been substantially completed. The **City** may include with such list a notice setting forth a reasonable time within which the **Contractor** must achieve Substantial Completion of the Work. If the **City** fails to respond, by presentation of a written declaration or itemized list as aforesaid, to the **Contractor's** certification within the twenty one (21) day period, the **Contractor's** certification shall take effect as the **City's** declaration that the Work has been substantially completed.

14.2. Partial Use or Occupancy of the Premises.

14.2.1. The **City** may occupy or use any completed or partially completed portion of the Work at any stage. Such partial occupancy or use may begin whether or not the portion is substantially complete, provided that the respective responsibilities of the **City** and the **Contractor** with respect to payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work, insurance, correction of the Work, and warranties shall be established by agreement of the **City** and the **Contractor** or, absent such agreement, shall be determined by the **Design Professional** subject to the right of either party to contest such determination as provided in Article 16.

14.2.2. Immediately prior to such partial occupancy or use, the **City**, the **Contractor** and the **Design Professional** shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

14.2.3. Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

14.2.4. (*Reference:* M.G.L. c. 30, §39G;). Within sixty five (65) days after the effective date of a declaration of Substantial Completion, the **City** shall prepare and send to the **Contractor** for acceptance a Substantial Completion estimate for the quantity and price of the Work done and all but one percent (1%) retainage on that Work, including the quantity, price and all but one percent (1%) retainage for the undisputed part of each item and extra work item in dispute, but excluding the disputed part thereof, less the estimated cost of completing all incomplete and unsatisfactory items and less the total periodic payments made to date for the Work. The **City** shall also deduct from the Substantial Completion estimate an amount equal to the sum of all demands for direct payment filed by Subcontractors and not yet paid to Subcontractors or deposited in joint accounts pursuant to M.G.L. c. 30, §39F.

14.2.5. (*Reference:* M.G.L. c. 30, §39G). If the **City** fails to prepare and send to the **Contractor** any Substantial Completion estimate required by the provisions herein on or before the date specified, the **City** shall pay to the **Contractor** interest on the amount which would have been due to the **Contractor** pursuant to such Substantial Completion estimate at the rate of three (3) percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston from such date to the date on which the **City** sends that Substantial Completion estimate to the **Contractor** for acceptance or to the date of payment therefor, whichever occurs first. The **City** shall include the amount of such interest in the Substantial Completion estimate.

14.2.6. (*Reference:* M.G.L. c. 30, §39G). Within fifteen (15) days after the effective date of the declaration of Substantial Completion, the **City** shall send to the **Contractor** by certified mail, return receipt requested, a complete list of all incomplete or unsatisfactory items, and unless delayed by causes beyond its control, the **Contractor** shall complete all such items within fortyfive- (45) days after the receipt of such list or before the date for final payment and acceptance, whichever is later. If the **Contractor** fails to complete such Work within such time, the **City** may, subsequent to seven (7) days' written notice to the **Contractor** by certified mail, return receipt requested, terminate the Contract and complete the incomplete or unsatisfactory items and charge the cost of same to the **Contractor**.

14.3. Final Inspection.

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

ARTICLE 15: GUARANTEES AND WARRANTIES

15.1. In General.

15.1.1. All guarantees and warranties specifically called for by the Specifications shall expressly run to the benefit of the **City**.

15.2. Warranties.

15.2.1. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof, unless otherwise provided in the certificate of Substantial Completion.

15.2.2. The **Contractor** warrants that the materials and equipment furnished under the Contract will be new and of recent manufacture unless otherwise specified, and that all Work will be of good quality, free from faults and defects, and in conformance with the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The **Contractor's** warranty excludes remedy for damage or defect caused by abuse, Modifications not executed by the **Contractor**, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the **Design Professional**, the **Contractor** shall furnish satisfactory evidence as to the kind and quality of material and equipment.

15.2.3. The **Contractor** warrants that title to all Work covered by an application for payment will pass to the **City** either by incorporation in the construction or upon the receipt of payment by the **Contractor**, whichever occurs first, free and clear of all liens. The **Contractor** further agrees that the submission of any application for payment shall conclusively be deemed to waive all liens with respect to said Work to which the **Contractor** may then be entitled, provided that such waiver of the lien rights shall not waive the **Contractor's** right to payment for such Work.

15.2.4. The **Contractor** warrants and guarantees that title to all Work, materials, and equipment covered by any application for payment, whether incorporated in the Project or not, will pass to the **City** no later than the time of payment free and clear of all liens.

15.2.5. No materials or supplies for the Work shall be purchased by the **Contractor** or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The **Contractor** warrants that it has good title to all materials and supplies used by it in the Work, free from all liens.

15.2.6. The **Contractor** shall indemnify and hold the **City** harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workers, mechanics, material persons, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. The **Contractor** shall at the **City's** request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If the **Contractor** fails to do so, then the **City** may, after having served written notice on the **Contractor** either pay unpaid

bills, of which the **City** has written notice, direct, or withhold from the **Contractor's** unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the **Contractor** shall be resumed, in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations on the **City** to either the **Contractor** or its surety. In paying any unpaid bills of the **Contractor**, the **City** shall be deemed the agent of the **Contractor** and any payment so made by the **City** shall be considered as payment made under the Contract by the **City** to the **Contractor** and the **City** shall not be liable to the **Contractor** for any such payment made in good faith.

15.3. Extended Warranties and Guarantees.

15.3.1. Any defective Work that is either corrected or replaced will be warranted and guaranteed for a period of three (3) years from the date of such correction or replacement.

ARTICLE 16: CLAIMS

16.1. In General.

16.1.1. Written Notice. A Claim must be made by written notice to the other party.

16.1.2. Content of Notice. The notice must include all written supporting data.

16.1.3. Burden of Proof. The party making the Claim must substantiate the Claim.

16.2. Time Limits on Claims.

16.2.1. Unless otherwise provided, all Claims must be made within twentyone (21) days after the occurrence of the event giving rise to such Claim or within -twentyone- (21) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Any change or addition to a previously made Claim shall be made by a written notice within the twenty-oneday- period in order to be valid.

16.3. Continuing Contract Performance.

16.3.1. Pending final resolution of a Claim including arbitration, unless otherwise agreed in writing, the **Contractor** shall proceed diligently with performance of the Contract and the **City** shall continue to make payments in accordance with the Contract Documents.

16.4. Types of Claims.

16.4.1. Claims for Differing Subsurface or Latent Physical Conditions. (*Reference:* M.G.L. c. 30, §39N;). If, during the progress of the Work, the **Contractor** or the **City** 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 **City** may request an equitable adjustment in the Contract Sum 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 **City** 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 **City** shall make an equitable adjustment in the Contract Sum and the Contract shall be modified in writing accordingly.

16.4.2. Claims for Additional Cost. If the **Contractor** claims that any acts or omissions of the **City** or the **Design Professional**, including any instructions or orders, whether oral, written, by drawings, or otherwise, involve extra cost or time, and the **Contractor** has not received a written acknowledgment by the **City** or the **Design Professional** that extra payment will be made or time extended on account thereof, the **Contractor** shall promptly so notify the **Design Professional** in writing of such Claim and shall proceed with the Work relating to such Claim and all rights of both parties with respect to such Claim shall be deemed to have been reserved. No Claim by the **Contractor** on account of such acts, omissions, instructions, or orders shall be valid unless the **Contractor** has so notified the **Design Professional** before proceeding.

16.4.2.1. Under no circumstances shall a Claim be made for additional cost where adverse weather conditions are the basis for the Claim.

16.4.3. Claims for Additional Time. If the **Contractor** wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The **Contractor** shall have the burden of demonstrating the effect of the claimed delay on the Contract Time and shall furnish the **Design Professional** with such documentation relating thereto as the **Design Professional** may reasonably require. Under no circumstances shall the **Contractor** make a Claim for an increase in the Contract Time due to a change in the **Contractor's** early completion date. If the increase in the Contract Time extends beyond the Contract Time established by the **City**, only the time that so extends beyond the Contract Time shall be reviewed and considered. In the case of a continuing delay, only one Claim is necessary.

16.4.3.1. Under no circumstances shall a Claim be made for additional time where adverse weather conditions are the basis for the Claim.

16.4.4. Claims for Injury to Person or Damage to Property. Should either party to the Contract suffer injury to person or damage to property because of any error, omission, or act of the other party or of any of the other party’s employees or agents or others for whose acts the other party is legally liable, a Claim will be made in writing to the other party within twentyone- (21) days of the occurrence of the act giving rise to the injury or damage.

16.5. Review of Claims.

16.5.1. Initial Referral. All Claims, the bases of which arise prior to final payment or the earlier termination of the Contract, shall be referred initially to the **Design Professional** for

action as provided herein.

16.5.2. Time Period and Action. The **Design Professional** shall review Claims and shall do one of the following within fourteen (14) days of receipt of the Claim:

16.5.2.1. defer any action with respect to all or any part of a Claim for the purpose of requesting and receiving additional information from either party;

16.5.2.2. decline in writing to render a decision for any reason which it deems appropriate (including, but not limited to, the fact that the Claim involves allegations of fault on the part of the **Design Professional**); or

16.5.2.3. render a decision on all or a part of the Claim.

16.5.3. If the **Design Professional** requests additional information, the **Design Professional** shall take action with respect to the Claim no later than fourteen (14) days after receipt of the additional information. The **Design Professional** shall notify the parties in writing of its disposition of such Claim. If the **Design Professional** renders a decision or declines to render a decision, either party may proceed in accordance with paragraph 16.7.

16.6. Decisions.

16.6.1. Decisions by the City or the Design Professional. (*Reference:* M.G.L. c. 30, §39P;). In every case in which this Contract requires the **City**, any official, or its **Design Professional** to make a decision on interpretation of the Specifications, approval of equipment, material or any other approval, or progress of the Work, the decision shall be made promptly and, in any event, no later than fourteen (14) days after the written submission for decision; but if such decision requires extended investigation and study, the **City**, the official, or the **Design Professional** shall, within fourteen (14) days after the receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty day period and the date by which the decision will be made.

16.6.2. When Decision of the Design Professional is Final and Binding. The decision of the **Design Professional** shall be final and binding on the parties, unless a party files suit or a demand for arbitration within thirty (30) days after the date of the decision.

16.6.3. When Decision of the Design Professional is Not Final and Binding. (*Reference:* M.G.L. c. 30, §39J). Notwithstanding any contrary provision of this Contract, no decision by the **City** or by the **Design Professional** on a dispute, whether of fact or of law, arising under said Contract shall be final or conclusive if such decision is made in bad faith, fraudulently, capriciously, arbitrarily, is unsupported by substantial evidence, or is based upon error of law.

16.6.4. Resolved Claims. If a Claim is resolved, the **Design Professional** shall obtain or

prepare the appropriate documentation and provide the **City** and the **Contractor** with a copy of same.

16.7. Arbitration.

16.7.1. Controversies and Claims Subject to Arbitration. Any controversy or Claim arising out of or related to the Contract, or the breach thereof, shall be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator or arbitrators may be entered in any court having jurisdiction thereof, except controversies or Claims relating to aesthetic effect, subject to the provisions of paragraph 16.7.7. In any such arbitration in which the amount stated in the demand is $100,000 or less, the American Arbitration Association shall appoint a single arbitrator in accordance with such Rules, who shall be a lawyer. In any such arbitration in which the amount stated in the demand is in excess of $100,000, the demand shall include the name of an arbitrator appointed by the claimant. The respondent shall appoint a second arbitrator and shall notify the claimant in writing of such appointment within thirty (30) days of receipt of the demand, failing which the matter shall be decided by the arbitrator named in the claimant's demand. Within thirty (30) days after the claimant's receipt of notice of the appointment of the second arbitrator, the two arbitrators shall appoint a neutral arbitrator and shall notify the parties in writing of such appointment, failing which either party may apply to the American Arbitration Association to appoint such neutral arbitrator. If such neutral arbitrator is appointed by the American Arbitration Association, he or she shall be a lawyer.

16.7.2. Rules for Arbitration. If the neutral arbitrator is appointed by the American Arbitration Association, the said Association shall administer the arbitration and its Construction Industry Arbitration Rules shall govern all aspects of the proceeding including the enforcement of any award. If the neutral arbitrator is not appointed by the American Arbitration Association, then the panel of arbitrators shall act as the administrator of the arbitration but the Construction Industry Arbitration Rules of the Association shall nonetheless govern all aspects of the proceeding, including the enforcement of any award, provided however that the arbitration panel shall have all of the powers and duties conferred on the Association pursuant to said rules. In addition, the following rules shall govern the selection of arbitrators and the proceedings:

16.7.2.1. Neither party may appoint as arbitrator an employee or an owner of that party, nor the parent, spouse, or child of an employee or owner of that party.

16.7.2.2. After the neutral arbitrator has been appointed, neither party may engage in *ex parte* communication with any arbitrator.

16.7.3. When Arbitration May Be Demanded. Demand for arbitration of any Claim, the basis of which arises prior to final payment or the earlier termination of the Contract may not be made before the earlier of (1) the date on which the **Design Professional** has rendered a written decision on the Claim or has notified the parties in writing that such decision will not be rendered or (2) fortyfive- (45) days following receipt by the **Design Professional** of a written request for a decision sent by registered or certified mail to both the **Design Professional** and the

other party to this Contract.

16.7.3.1. In no event shall a demand for arbitration be made after the date when the institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.

16.7.4. Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract Documents shall include, by consolidation or joinder or in any other manner, the **Design Professional**, the **Design Professional's** employees or consultants, except by written consent containing specific reference to the Contract and signed by the **Design Professional**, the **City**, the **Contractor,** and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the **City**, the **Contractor**, a separate contractor, and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the **City**, the **Contractor,** or a separate contractor shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a dispute not described therein or with a person or entity so named or described herein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Contract shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

16.7.5. Claims and Timely Assertion of Claims. A party who files a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. When a party fails to include a Claim through oversight, inadvertence, or excusable neglect, or when a Claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

16.7.6. Award Final. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

16.7.7. The City's Reservation of Rights. Notwithstanding any provision contained in this Article 16 or elsewhere in the Contract Documents, the **City** reserves the following rights in connection with Claims between the **City** and the **Contractor**, which rights may be exercised by the **City** unilaterally, in the **City's** sole discretion, and without the consent of the **Contractor**:

16.7.7.1. the right to institute legal action against the **Contractor** in any court of competent jurisdiction in lieu of demanding arbitration, in which case the dispute or disputes which are the subject of such action shall be decided by such court, and not by arbitration;

16.7.7.2. the right to obtain from any court of competent jurisdiction a stay of any arbitration instituted by the **Contractor**, provided that the application for such stay

is made before the appointment of the neutral arbitrator in such arbitration, in which case the dispute or disputes which are the subject of such arbitration shall be decided by such court and not by arbitration;

16.7.7.3. the right to require the **Contractor** to join as a party in any arbitration between the **City** and the **Design Professional** relating to the Project, in which case the **Contractor** agrees to be bound by the decision of the arbitrator or arbitrators in such arbitration.

16.7.8. In case the **City** elects to proceed in accordance with 16.7.7.1. or 16.7.7.2. above, the word "litigation" shall be deemed to replace the word "arbitration" wherever the latter word appears in the Contract Documents.

ARTICLE 17: EMERGENCIES

17.1. In an emergency affecting the health and safety of persons or property, the **Contractor** shall act to prevent threatened damage, injury, or loss.

17.2. In emergencies affecting the health, safety, or protection of persons, the Work or property at the Site or adjacent thereto, the **Contractor**, without special instruction or authorization from the **City** or the **Design Professional**, is obligated to act to prevent threatened damage, injury, or loss. The **Contractor** shall give the **Design Professional** prompt written notice if the **Contractor** believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the **Design Professional** determines that a change in the Contract Documents is required because of the action taken by the **Contractor** in response to such an emergency, a **Construction Change** Directive or Change Order will be issued to document the consequences of such action.

ARTICLE 18: TERMINATION OR SUSPENSION OF THE CONTRACT

18.1. Suspension by the City.

18.1.1. At any time and without cause, the **City** may suspend the Work or any portion thereof for a period of not more than ninety (90) days by notice in writing to the **Contractor** and the **Design Professional** that will fix the date on which Work will be resumed. The **Contractor** shall resume Work on the date so fixed. The **Contractor** shall be allowed an adjustment in the Contract Sum or an extension of the Contract Time, or both, directly attributable to any such suspension if the **Contractor** makes an approved Claim therefor.

18.1.2. If the Work is defective, if the **Contractor** fails to provide a sufficient number of skilled workers or suitable materials or equipment, or if the **Contractor** defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a sevenday- period after receipt of written notice from the **City** to begin and prosecute correction of such default or neglect with diligence and promptness, the **City** may correct such deficiencies, without prejudice to other remedies the **City** may have. In such case, an appropriate **Construction Change** Directive shall be issued deducting from payments then or thereafter due

to the **Contractor** the cost of correcting such deficiencies including compensation for the **Design Professional's** additional services and expenses made necessary by such default, neglect, or failure and any and all direct, indirect, or consequential costs associated with the order to stop the Work. If such payments then or thereafter due the **Contractor** are not sufficient to cover such amounts, the **Contractor** shall immediately pay the difference to the **City**. The **Contractor** shall remain responsible for maintaining progress and shall not be entitled to any increase in the Contract Time or the Contract Sum.

18.2. Termination by the Contractor.

18.2.1. If, through no act or fault of the **Contractor**, a Subcontractor, or a Subsubcontractor-, the Work is suspended for a period of more than ninety (90) days by the **City**, or under an order of court or other public authority, or the **Design Professional** fails to act on any application for payment within thirty (30) days after it is submitted in proper form and content or the **City** fails for thirty (30) days to pay the **Contractor** any sum finally determined to be due, then the **Contractor** may terminate the Contract upon seven (7) days' written notice to the **City**, provided that the **City** does not remedy such suspension or failure within that time.

18.3. Termination by the City.

18.3.1. If the **Contractor** is adjudged a bankrupt, or if the **Contractor** makes a general assignment for the benefit of the **Contractor's** creditors, or if a receiver is appointed on account of the **Contractor's** insolvency, or if the **Contractor** persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if the **Contractor** fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction or disregards an instruction, order, or decision of the **Design Professional**, or otherwise is guilty of substantial violation of any provision of the Contract, then the **Contractor** shall be in default, and the **City** may, without prejudice to any other right or remedy and upon written notice to the **Contractor**, take possession of all materials, tools, appliances, equipment, construction equipment and machinery and vehicles, offices and other facilities on the Project Site, and all materials intended for the Work, wherever stored, and, seven (7) days after such notice, may terminate the employment of the **Contractor**, accept assignment of any or all subcontracts pursuant to Paragraph __, and finish the Work by whatever method the **City** may deem expedient. The **City** shall be entitled to collect from the **Contractor** all direct, indirect, and consequential damages suffered by the **City** on account of the **Contractor's** default, including without limitation additional services and expenses of the **Design Professional** made necessary thereby. The **City** shall be entitled to hold all amounts due to the **Contractor** at the date of termination until all of the **City's** damages have been established, and to apply such amounts to such damages.

18.3.2. (*Reference:* Somerville Municipal Code Chapter 2.117, Section 2.117.110C). In the event the **Contractor** or any of its agents or employees violates any provision of Somerville Municipal Code Chapter 2.117 that is applicable to **City** contractors in connection with the awarding, administration, or performance of the Contract, the **City** may terminate the Contract.

ARTICLE 19: AMERICANS WITH DISABILITIES ACT; (42 U.S. 12131)

19.1. On July 26, 1994, the Americans with Disabilities Act ("the Act") became effective for employers of fifteen or more employees.

19.2. The Act protects against discrimination of the basis of "disability," which is defined as a physical or mental impairment that substantially limits at least one "major life activity;" or discrimination against an individual who has a record of such impairment; or discrimination against an individual being regarded - even if inaccurately - as having such impairment. The Act also expressly prohibits job discrimination that is based on any individual's relationship or association with a disabled person.

19.3. If the **Contractor** is subject to the Act, it must comply with its provisions.

ARTICLE 20: WRITTEN NOTICE TO THE PARTIES

20.1. In General.

20.1.1. All written communications from the **Design Professional** to the **Contractor** shall be copied to the **City**. All written communications from the **Contractor** to the **Design Professional** shall be copied to the **City**. All written communications from the **Contractor** to the **City** shall be copied to the **Design Professional**.

20.2. Addresses.

20.2.1. To the City. Written notice to the **City** shall be sent or hand delivered to:

Purchasing Director
City of Somerville
93 Highland Avenue
Somerville, MA 02143

City Solicitor
Law Department
93 Highland Avenue
Somerville, MA 02143

Executive Director
Office of Strategic Planning & Community Development 93
Highland Avenue
Somerville, MA 02143

20.2.2. To the Contractor. Both the address given on the bid form upon which the Agreement is founded and the **Contractor's** office at or near the Site of the Work are hereby designated as places to either of which notices, letters, and other communications to the **Contractor** shall be certified, mailed, or delivered. Delivery of any notice, letter, or other

communication to the **Contractor** at or depositing same in a postpaid wrapper directed to either place shall be deemed sufficient service thereof upon the **Contractor**. Written notice shall be deemed to have been duly served on the **Contractor** if it is sent or hand delivered to any member or officer of the **Contractor**. The date of said service shall be the date of such delivery or mailing. The address may be changed at any time by an instrument in writing, executed and acknowledged by the **Contractor** and delivered to the **City** and to the **Design Professional**. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon the **Contractor** personally. Moreover, any notice, letter, or other communication required under the Contract may be served on the **Contractor's** representative at job meetings. The **Contractor** shall provide the **City** with its change of address seven (7) days prior to its effective date.

20.2.3. To the Design Professional. Written notice to the **Design Professional** shall be sent or hand delivered to the address appearing on the Project Manual. Written notice shall be deemed to have been duly served on the **Design Professional** if it is sent or hand delivered to any member or officer of the **Design Professional**.

ARTICLE 21: MISCELLANEOUS PROVISIONS

21.1. Governing Law.

21.1.1. This Contract shall be governed by the laws of the Commonwealth of Massachusetts.

21.2. Venue.

21.2.1. Venue for any court action or proceeding shall be Middlesex County in the Commonwealth of Massachusetts only. The **Contractor**, all Subcontractors, and Suppliers waive any and all jurisdictional and venue defenses.

21.3. Successors and Assigns.

21.3.1. The **Contractor** shall not assign, in whole or in part, its rights and obligations under the Contract Documents without prior written consent of the **City**. An assignment without the prior written consent of the **City** shall not relieve the **Contractor** of its obligations thereunder.

21.3.2. The **City** and the **Contractor** respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents.

21.4. Statutory Limitation Period.

21.4.1. It is expressly agreed that the obligations of the **Contractor** hereunder arise out of contractual duties, and that the failure of the **Contractor** to comply with the requirements of the Contract Documents shall constitute a breach of contract, not a tort, for the purpose of applicable

statutes of limitations and repose. Any cause of action which the **City** may have on account of such failure shall be deemed to accrue only when the **City** has obtained actual knowledge of such failure, not before.

21.5. Rights and Remedies.

21.5.1. Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

21.5.2. No action or failure to act by the **City**, the **Design Professional,** or the **Contractor** shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

PART 2 - SAMPLE CONSTRUCTION CONTRACT

IMPORTANT INFORMATION REGARDING CERTIFICATE OF GOOD STANDING

- Sample Contract
- Certificate of Authority
- Appendix A – Scope of Work (including Technical Specifications)
- Appendix B – Contractor's Bid Price; Form for General Bid (From Bid Book)
- Appendix C – General Terms and Conditions
- Appendix D – Insurance Requirements
- Appendix E – Wage Rates and Living Wage (From Bid Book)
- Appendix F – Certificate of Good Standing (for corporations; from Bid Book)
- Appendix G – Procurement documentation (Advertisements and Notice to Bidders)
- Appendix H – Statement of Management
- Appendix I – Performance Bond and Payment Bond, if contract over $2000

S A M P L E C O N T R A C T

CONTRACT NUMBER

A-

PURCHASE ORDER # AND AMOUNT

BID NUMBER

ISSUING DEPARTMENT

FUNDING DEPARTMENT (Division)

CONTRACT PERIOD

CITY OF SOMERVILLE
MAYOR'S OFFICE OF STRATEGIC PLANNING AND COMMUNITY DEVELOPMENT

PUBLIC CONSTRUCTION CONTRACT

FOR: Medford Street at Pearl Street Sewer Replacement

CONTRACTOR: Vendor
Address
Town Name, MA

ACCORDING TO SPECIFICATIONS CONTAINED HEREIN

CITY OF SOMERVILLE

OWNER-CONTRACTOR PUBLIC CONSTRUCTION AGREEMENT

AGREEMENT made this --- day of _____, by and between the City of Somerville, a Massachusetts municipal corporation, acting by and through its Purchasing Department, with a usual address of 93 Highland Ave., Somerville, MA 02143 ("City", "Owner" or "Awarding Authority") and the following General Contractor ("Contractor" or "General Contractor"):

GENERAL CONTRACTOR:
Name:
Address:
Telephone: Fax:
E-Mail:

PROJECT: The Medford Street at Pearl Street Sewer Replacement work consists of replacement of the existing severely distressed 28" brick sewer with a new 24" PVC sewer, along with demolition and replacement of the associated brick manholes.

PROJECT MANAGER:
Charles Quigley, Director of Engineering
DPW – Engineering
1 Franey Road
Somerville, MA 02145
Phone: (617) 625-6600 x5410

DESIGN PROFESSIONAL:
Kleinfelder
215 First Street
Suite 320
Cambridge, MA 02142
Contact: Gus O'Leary
GOLeary@kleinfelder.com

LOCATION OF PROJECT

The project site is located at approximately 343 Medford Street, Somerville, MA 02145.

Profession: Architect [ ] Landscape Architect [ ] Engineeer [X]

FUNDING SOURCE: Federal [ ] State [ ] City [X]

THIS CONTRACT IS A:

X Public Works Contract estimated to cost more than $10,000 subject to

the bidding requirements of G.L. c. 30, § 39M

__ Public Building Contract estimated to cost under $10,000, subject to the price quote requirements of G.L. c. 149 §44A (2)(A)

__ Public Building Contract estimated to cost more than $10,000 but less than $25,000, subject to the written response requirements of G.L. c. 149, §44A(2)(B) of the General Laws

__ Public Building Contract estimated to cost more than $25,000 but less than $100,000, subject to the bidding requirements of G.L. c. 149, §44A(2)(C) and G.L. c. 30, § 39M

__ Public Building Contract estimated to cost more than $100,000, subject to the bidding requirements of G.L. c. 149, §44A(D).

Section 1: CONTRACT DOCUMENTS/APPENDICES

The Contract Documents consist of this Agreement; the notice of award of the Contract; the Notice to Proceed; the entire Project Manual; Change Orders; Construction Change Directives; the Contractor's Bid and all accompanying documents; and the Design Professional's written interpretations and clarifications issued on or after the issuance of the Notice to Proceed. Shop Drawing submittals and reports or drawings utilized by the Design Professional in preparing the Contract Documents are not Contract Documents.

The following Appendices are hereby incorporated by reference as part of this Agreement.

X Certificate of Authority

* Appendix A - Scope of Services - Misc. Bid Documents: includes a brief description of the Project, the Plans and Technical Specifications (Plans on File) and Addenda issued during the bid process

X Appendix B - Contractor's Bid Price; Form for General Bid

X** Appendix C - General Conditions

X** Appendix D - Insurance Requirements with Contractor's Insurance Certificate(s)

X Appendix E - Wage Rates; Living Wage

X Appendix F - Certificate of Good Standing (for corporations)

X Appendix G - Procurement Documentation (includes Advertisement; Notice to Bidders)

X Appendix H - Statement of Management (over $100,000)

X Appendix I - Performance Bond and Payment Bond, if contract is over $2,000

X Appendix J - Section 3 Requirements

X Appendix K – Laws Applicable to Federally Funded Contracts

X = Attached
* = Included in the Project Manual and incorporated herein by reference
** = Attached and also duplicated in the Project Manual

Section 2: THE CONTRACTOR'S WORK.

The Contractor's "Work" refers to the services and the entire completed construction or the various separately identifiable parts thereof required by the Contract Documents, including all labor, materials, and equipment furnished, furnished and incorporated into the Project, or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

Section 3: PROJECT DATES.

(a) Contract Period: The Contract shall begin on September 23rd, 2016 and end on May 12th, 2017

(b) Date of Commencement of Work: The Date of Commencement of the Work shall be stipulated by a written Notice to Proceed given by the City to the Contractor.

(c) Between the date of the Notice to Proceed and the date of Substantial Completion the Contractor shall have two consecutive weeks to complete the work. Work hours during this two week period shall be 7 a.m. to 8 p.m. Refer to Section 01063 for schedule and sequencing.

(d) Date of Substantial Completion: The Contractor shall achieve Substantial Completion of the Work on or before November 18th, 2016 or 56 calendar days after the Date of Commencement of the Work, time being of the essence. Substantial Completion means that the Work has been completed and the Site or the facility is opened for full and intended public use, except for minor incomplete or unsatisfactory items that do not materially impair the usefulness of the Work. The Design Professional shall decide what constitutes "minor," "incomplete," "unsatisfactory," and "materially" and the Design Professional's decision shall be final.

(e) Date of Final Completion:
The Date of Final Completion shall be May 12th, 2017.

Section 4. CONTRACT SUM/LIQUIDATED DAMAGES

(a) Contract Sum: The Contract Sum shall be $_____ .

(b) Liquidated Damages: The Contractor and the City agree to a Liquidated Damages sum of $2600.00 per work day.

SIGNATURE PAGE FOLLOWS

IN WITNESS WHEREOF, the City and the Contractor have executed this Contract as a sealed instrument as of the date first written above.

CITY OF SOMERVILLE

I hereby certify that an unencumbered balance of $_____ is available for this Contract and I further certify that the sum of $_____ is hereby encumbered against the appropriate account for the purposes of this contract.

_____
Edward Bean, City Auditor

_____
Joseph A. Curtatone
Mayor

_____
Michael F. Glavin, OSPCD
Executive Director

_____
Angela M. Allen, Purchasing Director

Approved as to form:

_____
Francis X. Wright, Jr., City Solicitor

VENDOR:

_____
Signature of Authorized Agent of Vendor

Printed Name: _____
Title: _____

Vendor Address: _____
_____

Federal Tax ID: #_____

FOR CORPORATIONS ONLY:

_____
Clerk's Signature

_____
Clerk's Name

APPENDIX A
Scope of Services – Miscellaneous Bid Documents

Includes a brief description of the project
The Plans and Technical Specifications (Plans on File)
And all addenda issued during the bid process.

APPENDIX B
Contractor's Bid Price - Form for General Bid
(From Bid Book)

APPENDIX C
General Conditions
(From Bid Book)

APPENDIX D
INSURANCE REQUIREMENTS

APPENDIX E
PREVAILING WAGE RATES AND LIVING WAGE FORM

APPENDIX F
CERTIFICATE OF GOOD STANDING
(FOR CORPORATIONS)

INSERT DOCUMENT FROM BID BOOK HERE

Certificate of Good Standing: If the bidder is a corporation, a Certificate of Good Standing should accompany the bid. Certificate of Good Standing available online at:
http://corp.sec.state.ma.us/corp/Certificates/Certificate_Request.asp
or call Tel: (617) 727-9640 for more information.

APPENDIX G
PROCUREMENT DOCUMENTATION

ADVERTISEMENTS, NOTICE TO BIDDERS, ETC.

APPENDIX H

STATEMENT OF MANAGEMENT
FOR CONTRACTS OVER $100,000

STATEMENT OF MANAGEMENT

In accordance with M.G.L. Chapter 30, Section 39R, the undersigned successful bidder states that its system of internal accounting controls and that of its subsidiaries reasonably assure (1) that transactions are executed in accordance with management's general and specific authorization; (2) that transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles, and to maintain accountability for assets; (3) that access to assets is permitted only in accordance with management's general or specific authorization, and (4) that the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

Executed this _____day of _____2014__

On behalf of _____
(Successful bidder name)

_____
(Address and telephone of successful bidder)

_____
(Name and title of person signing statement)

By:_____
(Signature)

CERTIFIED PUBLIC ACCOUNTANT STATEMENT

In accordance with M.G.L. 30, Section 39R I, _____
a certified public accountant, state that I have examined the above Statement of Management on internal accounting controls, and that in my opinion (1) the representations of management are consistent with the result of management's evaluation of the system of internal accounting controls; and (2) that such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the above referenced successful bidder's financial statements.

_____

(Signature)

_____

(Business name, address and telephone number)

APPENDIX I

PERFORMANCE BOND AND PAYMENT BOND

FOR CONTRACTS OVER $2000

PART 3 - TECHNICAL SPECIFICATIONS

PART 3: TECHNICAL SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

01010	Summary of Work
01025	Measurement and Payment
01040	Project Coordination and Meetings
01045	Cutting and Patching
01060	Permits and Regulatory Requirements
01063	Sequencing of Work
01070	Abbreviations
01090	Reference Standards
01108	Health and Safety Procedures
01200	General Requirements for Utility Work
01300	Submittals
01311	Scheduling and Reporting
01390	Pre-Construction Survey
01400	Quality Control
01500	Temporary Facilities and Controls
01505	Mobilization
01560	Temporary Environmental Controls
01568	Erosion Control, Sedimentation and Containment of Construction Materials
01570	Maintenance and Protection of Traffic
01600	Products, Materials and Equipment
01630	Restoration of Grounds and Cleaning Up
01701	Project Closeout

DIVISION 2 – SITE WORK

02010	Subsurface Investigation
02015	Vibration Monitoring
02051	Demolition, Modification, Abandonment
02080	Soil and Waste Management
02095	Transportation and Disposal of Soil and Fill
02100	Site Preparation
02140	Dewatering
02160	Temporary Excavation Support Systems
02210	Earth Excavation, Backfill, Fill and Grading
02252	Manholes
02500	Paving and Surfacing
02590	Brick Masonry
02622	Polyvinyl Chloride Pipe
02760	Pipeline Cleaning and Internal Inspection
02761	Flow Bypass

DIVISION 3 - CONCRETE

03300	Concrete
03315	Grout

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

07160	Bituminous Dampproofing

APPENDIX

Appendix A	Oil and Hazardous Materials Findings, Soil Management Recommendations
Appendix B	Boring Logs
Appendix C	Algonquin Gas Requirements for Construction Near Company Pipelines

LIST OF CONTRACT DRAWINGS

Sheet No.	Sheet Title
-	COVER
G-1	GENERAL NOTES
C-1	SITE PLAN AND PROFILE
CG-1	DETAILS
CG-2	GEOTECHNICAL MONITORING AND INSTRUMENTATION PLAN AND DETAILS
TMP-1	TRAFFIC MANAGEMENT NOTES AND DETAILS
TMP-2	TRAFFIC MANAGEMENT DETOUR PLAN

END OF SECTION

SOMERVILLE, MASSACHUSETTS

TECHNICAL SPECIFICATIONS FOR

MEDFORD STREET AT PEARL STREET SEWER REPLACEMENT

March, 2016

KLEINFELDER
Bright People. Right Solutions.

TABLE OF CONTENTS

DIVISION 1 - GENERAL REQUIREMENTS

DIVISION 2 – SITE WORK

DIVISION 3 - CONCRETE

APPENDIX

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 for the Contract is located in the City of Somerville primarily on Medford Street east of School Street and extending onto Pearl Street. The work consists of removal and replacement of approximately 80 linear feet of brick gravity sewer and two (2) brick manholes.

1.3 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals to remove and replace the existing gravity sewer and manholes complete and ready for operation as indicated on the Drawings and specified herein.

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 with public and private utilities for the protection and support of their facilities as may be required.

2. Coordination with Eversource Electric and support for relocation of the electrical service at Sta. 1+13.

3. Installation of PVC sewer with related manholes

4. Removal and reconnection of existing services which connect the Work of this Contract.

5. Demolition of existing structures and pipes.

6. Grout sealing of existing pipe penetrations through the storm drain.

7. Disposal of excess geotechnically unsuitable excavated material.

8. Vibration monitoring and installation of structure, ground, and utility monitoring points.

9. Reuse geotechnically suitable excavated material on site as backfill and dispose of excess material from excavation not required for fill or backfill as specified, and to the satisfaction of the Owner.

10. Trench pavement restoration.

11. Replacement of disturbed pavement markings.

C. The work shall conform to such additional drawings, specifications and addenda to these Specifications and Drawings as may be published or exhibited prior to the opening of Bid Proposals 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 Specification, or shown on the Drawings, but implied by the Contract shall be furnished by the Contractor and included in the Contractor's Unit and Lump Sum Prices Bid. The work and materials 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. For the purposes of this Contract, anywhere the term "Temporary" is used in the Specifications, in the Plans, in Contract Addenda, in any revisions made to the Contract Documents at any time prior to or during construction, verbally, in writing, in change orders or work change directives or at any other time whether listed here or not, it shall be taken to mean "Temporary" only as it relates to the duration of the Contract. All repairs, restoration, and construction shall be considered permanent.

1.2 CONSTRUCTION SEQUENCE

Inclusion of the following sequencing restrictions does not relieve the Contractor from its responsibility to complete the Work with the specified contract duration, nor does it relieve the Contractor from its responsibility to sequence and carry out the work so as not to cause harm to the existing systems, environment, or community.

A. Pre-construction Survey

B. Establish baseline Sedimentation and Erosion Control

C. Establish baseline Geotechnical Instrumentation and Monitoring

D. Mobilization

E. Establish advance warning Traffic Management

F. Layout of site work and survey control

G. Prior to installation of the Work the Contractor shall verify the relocation of any existing utilities that are scheduled for relocation, coordinate with the responsible utility, and relocate those utilities which are the Contractor's responsibility as per these Contract Documents.

1.3 UNDERGROUND UTILITIES

A. The underground utilities shown on the plans have been located primarily from information furnished by others and are considered approximate both as to size and location. There may be additional utilities to be encountered that are not shown on the plans, and 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, as required by Owner. Unapproved service interruptions will not be allowed. Refer to Specification Section 01200 for additional utility coordination information and requirements.

1.4 SURFACE RESTORATION

A. Any damage to the pavement, curbing, or sidewalks outside of the limits of excavation and excavation support as defined in the Contract Documents shall be the responsibility of the Contractor and all costs associated with the repair of the excavation, sub-base, pavement, curbing, and sidewalks shall be fully borne by the Contractor. Repairs shall be immediately made by the Contractor as per the Contract Documents and as required by the Engineer.

1.5 HOURS OF WORK

A. The hours of work shall be Monday through Friday, 7:00 a.m. – 8:00 p.m. excluding City of Somerville Holidays. For additional hours restrictions, refer to Specification Section 01063 – Sequencing of Work.

B. During non-work hours (8:00 p.m. – 7:00 a.m. weekdays; weekends and holidays), the Contractor shall make the following provisions:

1. Access to all properties shall be maintained. Work zones shall be clean, protected and safe. The Contractor shall minimize the amount of parking restrictions.

2. At the end of each work day, the Contractor shall backfill and pave and/or place steel road plates over all excavations so as to maintain emergency vehicle and pedestrian traffic access and flow. Under no circumstances will open excavations be allowed during non-work hours. All parking will be given back to the community and businesses

during non-work hours. Work zones shall be cleaned, protected and made safe.

1.6 CONTRACTOR USE OF PROJECT SITE

A. The Contractor's use of the project site shall be limited to its construction operations, including on-site storage of materials, and on-site fabrication facilities.

B. The Contractor shall determine the location(s) of the staging area(s) to be used for this project and shall obtain approval of the location(s) from the City of Somerville prior to any mobilization activities. The Contractor shall not store equipment or materials on private properties, without prior negotiations with the property owner. The Contractor shall not store any materials on Medford Street or Pearl Street during non-working hours.

C. The Contractor shall maintain access to street parking and driveway parking and access to all properties and businesses outside the work zone during off work hours.

1.7 LIST OF DRAWINGS

A. The location, general characteristics, and principal details of the work are indicated on a set of drawings entitled "MEDFORD STREET AT PEARL STREET SEWER REPLACEMENT".

B. The drawings stated above are the Contract Drawings, sometimes referred to herein as the "Drawings." Additional drawings showing details in accordance with which the work is to be done may be furnished from time to time by the Engineer, if found necessary, and shall then become a part of the Drawings.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01010

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 — GENERAL

1.1 SUMMARY

A. Payment for the items specified in the Bid Schedule shall include compensation for furnishing all labor, tools, equipment, supplies, and manufactured articles, and for all operations, and incidentals appurtenant to the items of work described, to complete the various items of the Work, all in accordance with the requirements of the Contract Documents, Drawings, Specifications, Addendum, and other modifications issued and approved by the Owner and Engineer.

B. Payment for the items specified in the Bid Schedule shall include all costs for permits and compliance with the regulations of public agencies having jurisdiction including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA).

C. The bid prices listed in the Bid Schedule shall include all Work items described or implied in the Contract Documents, Drawings, Specifications, Addendum, and other modifications issued and approved by the Owner and Engineer, and all other Work items necessary to manufacture, furnish, install and test a complete working project.

D. The following items are considered “Incidental” to the completion of the Work included in this Contract. These incidental work items shall be included in the Bid Schedule prices and are not included for separate payment. The incidental work items include, but are not limited to:

a. Abandonment, removal and disposal of existing, abandoned or relocated private utilities not specified for payment elsewhere

b. Construction photographs

c. Attending Owner meetings, neighborhood meetings, and all other Construction meetings

d. Submitting work plans, shop drawings, and materials samples.

e. Protection of installed materials from damage, and replacement of damaged materials as directed by the Engineer.

f. Warrantees and Guarantees as indicated in the Contract Documents.

g. Maintenance of plant materials as indicated in the Contract Documents.

h. Concrete encasement of impacted utilities

i. Dust control and air quality monitoring for dust, methane, hydrogen sulfide, % Lower Explosive limit, oxygen, and total volatile organic compounds.

j. Street sweeping, including power sweeping as required.

k. Removal of snow from streets and sidewalks where work is ongoing

l. Transporting trash and recyclables out of the work area where municipal pickup is hindered

m. Providing certificates of design where required

n. Developing and submitting CPM baseline schedule, monthly schedule updates, and weekly construction schedule projections and updates

o. Fulfilling all reporting requirements

p. Clean-up and restoration of all surface features not included for payment elsewhere.

q. Obtain all permits including payment of fees

r. Demolition and Removal of Pipe

s. Permanent Masonry Plugs and Bulkheads for Pipe Abandonment

t. CDF for pipe abandonment

u. Furnishing and Placing Backfill by one of the approved methods listed below:

    1. Reuse excavated material, if suitable, immediately on site at the general area of excavation.

    2. Furnish and install imported suitable backfill

3. Transport the material to a staging area, stage and protect the material, load the material, transport the material to be used as backfill at the general area of excavation.

v. Furnishing, installing, compacting and testing gravel sub-base by one of the approved methods listed below:

1. Reuse excavated sub-base material, if suitable, immediately on site at the general area of excavation, as sub-base material

2. Furnish and install imported suitable gravel sub-base

3. Transport the material to a staging area, stage and protect the material, load the material, transport the material to be used as sub-base at the general area of excavation.

w. Remove and reset all signs and sign posts, meters, trash receptacles, or any other site feature or furnishing not specifically listed for separate payment elsewhere.

x. Pre- and Post- Construction Video

y. Protection of private property including walls at the back of sidewalk.

E. No separate payment shall be made for any item that is not specifically specified in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenant items of work.

F. The Contractor and Subcontractors shall not take advantage of any apparent error or omission on the Drawings or in the Specifications. The Contractor and Subcontractors shall make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents at no additional cost to the Owner.

G. Anywhere in these Contract Documents, the term furnish shall mean manufacture; supply; delivery to the Project site including the actual unloading and unpacking; assembly; erection; placing; installation; anchoring; applying; working to dimension; finishing; curing; protecting; cleaning; testing; start-up; and similar operations unless stated otherwise.

1.2 LUMP SUM ITEMS

A. Payment for the lump sums shall be full compensation for all labor, materials and equipment required to furnish, install, construct, startup and test the work covered under that lump sum item, whether listed in the related Compensation subsection for each item or not. All supervision; overhead items including but not limited to bonds, insurance, and labor burden; and profit are also included.

B. Payment shall fully compensate the Contractor for any other work which is not specified or shown, but which is necessary to complete the Work.

1.3 UNIT PRICE ITEMS

A. Unit prices shall be full compensation for all labor, materials and equipment required to furnish, install, construct, startup and test the work covered under that unit price item, whether listed in the related Compensation subsection for each item or not. All supervision; overhead items including but not limited to bonds, insurance, and labor burden; and profit are also included.

B. Payment shall fully compensate the Contractor for any other work which is not specified or shown, but which is necessary to complete the Work.

1.4 MEASUREMENT FOR PAYMENT

A. Work completed to date shall be submitted by the Contractor and substantiated as required by the Engineer.

B. The Owner and Engineer will review the submittal for completeness and verification. Failure to submit any of the below requirements will be grounds for a rejection of the submitted pay request until such time as the submittals are complete, accurate, up to date, and have been approved by the Owner and Engineer.

1. Include a checklist of completed items. Only items signed-off by the Engineer will be considered for payment.

2. Include red-lined “As-built” drawings indicating degree of completion, as described in Section 01400 – QUALITY CONTROL.

3. Include a revised CPM schedule and narrative as required in the Specifications and showing actual record information.

4. Include a copy of all required test results including, but not limited to geotechnical and settlement monitoring results, compaction test

results, concrete strength test results, grain size analysis and analytical test results.

5. Certified pay-rolls for general and all sub-contractors.

6. MBE and WBE reporting and certifications as required by the Contract.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01025

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SECTION 01040

PROJECT COORDINATION AND MEETINGS

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes general coordination requirements including preconstruction conference, site mobilization conference, and progress meetings.

1.2 CONTRACTOR COORDINATION

A. Coordinate scheduling, submittals, and the Work to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Contractor shall coordinate work with the City of Somerville Communications Department. Contractor shall prepare notifications in cooperation with the City and shall distribute them to residents 1-week in advance of work. Contractor shall assume that up to three (3) notifications shall be prepared, coordinated, and distributed throughout the contract.

C. Coordinate completion of the Work and clean up for Substantial Completion and for portions of Work designated for Owner's partial utilization.

C. Coordinate access to site for correction of nonconforming Work to minimize disruption of Owner's activities where Owner is in partial utilization.

D. Contractor to provide a project manager for the duration of the project.

1.3 PRECONSTRUCTION CONFERENCE

A. The Owner will schedule a preconstruction conference.

B. Attendance Required: Owner’s representatives, Engineer, Contractor, Contractor’s Project Manager and Superintendent and major Subcontractors.

C. Sample Agenda:

1. Designation of personnel representing the parties in Contract and the Architect/Engineer.

2. Description of the Project background, purpose, basis of design and major elements of the Work.

3. Community Relations requirements

4. Soil and Waste Management requirements

5. Major Geotechnical requirements such as temporary support of excavation; backfill and compaction; geotechnical instrumentation and monitoring, and dewatering.

6. Requirements and procedures for the submission of change orders and pay requisitions.

7. Requirements, procedures and processing of shop drawings and other submittals; Schedules and schedule updates; substitutions; and Requests for Information.

8. Scheduling of the Work and coordination with other contractors.

9. Review of Subcontractors

10. Continuation of City services (trash and rubbish removal, recycling, street sweeping, dust control, tree protection, and snow removal).

11. Meeting requirements (Progress, Work Shops, etc.)

12. Utility coordination

13. Traffic and pedestrian management requirements

14. Other

1.4 PROGRESS MEETINGS

A. Project meetings shall be held at a location designated by the Owner and Engineers. Meetings shall be held at weekly intervals, or as required by the Owner or Engineer.

B. Attendance Required: Job superintendent, Contractor's Project Manager, major Subcontractors and suppliers, Owner representatives, and Architect/Engineer as appropriate to agenda topics for each meeting.

C. The Owner or Engineer or their representative will make arrangements for meetings, and record minutes.

D. The Owner or Engineer or their representative will prepare the agenda and preside at meetings.

F. Contractor shall provide required information and be prepared to discuss each agenda item.

G. Sample Agenda:

1. Review minutes of previous meetings

2. Community Relations

3. Review of work progress. Review of work completed, work on going and work scheduled within the coming month.

4. Field observations, problems, and decisions

5. Identification of problems which impede planned progress

6. Review of submittals schedule and status of submittals

7. Review of RFI and RFP status

8. Proposed Change Orders (PCO), claims, credits, Work Change Directive, and change order status

9. Review of off-site fabrication and delivery schedules

10. Maintenance of progress schedule

11. Corrective measures to regain projected schedules

12. Maintenance of quality and work standards

13. Effect of proposed changes on progress schedule and coordination

14. Other item relating to Work

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01040

SECTION 01045

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1. Requirements of this Section do not apply to mechanical installations.

1.2 SUBMITTALS

A. Submit proposed procedures for cutting and patching a minimum of 2 weeks in advance of the time cutting and patching will be performed. The submittal shall contain, but not be limited to the following information:

1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.

2. Describe anticipated results in terms of changes to existing or proposed construction; include changes to structural elements and operating components.

3. List firms or entities that will perform Work.

4. Indicate dates when cutting and patching is to be performed.

5. List utilities, service, or performance that will be disturbed or affected and indicate how long service will be disrupted.

6. Where cutting and patching involves addition of reinforcement to structural elements, submit details stamped by a Massachusetts Professional Engineer to show how reinforcement is integrated with the original structure.

B. Review by the Engineer prior to proceeding with cutting and patching does

not waive the Engineer's right to later require complete removal and replacement of a part of the Work found to not meet the requirements of the Contract.

1.3 QUALITY ASSURANCE

A. Requirements for Structural and Utility Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

1. Submit the cutting and patching proposal, including a structural analysis and design of additional reinforcement, stamped by a Massachusetts Professional Engineer, before cutting and patching.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

1. Submit the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:

a. Shoring, bracing, and sheeting.

b. Primary operational systems and equipment.

c. Control systems.

d. Electrical wiring systems.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior, in a manner that would, in the Engineer's opinion, reduce aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work that has been cut and patched that does not meet requirements of the Contract as determined by the Engineer.

1. Retain the original installer or fabricator to cut and patch or if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm acceptable to the Engineer:

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use materials whose installed performance will equal or surpass that of existing materials.

B. Where cutting and patching occurs on exposed exterior structures or work, use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

1. Before proceeding, meet at the site with parties involved in cutting and patching, including but not limited to mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Take all precautions to avoid cutting existing pipe, conduit or duct banks that are scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 CUTTING

A. General: Employ skilled workmen to perform cutting and patching. Complete cutting and patching without delay.

B. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

C. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible, review the proposed procedures with the original installer or manufacturer or with an installer or manufacturer with similar experience. Comply with the installer's and / or manufacturer's recommendations.

D. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

E. Cut through concrete and masonry using a cutting machine such as carborundum saw or diamond core drill.

F. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

3.4 PATCHING

A. Inspect and test patched areas to demonstrate integrity of the installation.

3.5 CLEANING

A. Thoroughly clean areas where cutting and patching is performed or used as access. Remove completely mortar, oils, reinforcing, concrete, masonry and items of similar nature. Thoroughly clean piping, conduit and similar features before finishing is applied. Restore damaged pipe to its original condition.

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01045

SECTION 01060

PERMITS AND REGULATORY REQUIREMENTS

1060.1 MWRA DEWATERING DISCHARGE PERMIT FEE ALLOWANCE

PART 1 - GENERAL

1.1 REGULATORY AGENCIES

A. The Contractor shall comply with all laws, rules, and regulations and ordinances promulgated by any authority having jurisdiction over the Work.

B. The Contractor shall be fully responsible for obtaining and complying with all required permit(s). The Contractor shall be responsible for including all costs and fees required to obtain and comply with the permits, in the Bid. The Contractor shall ensure that all necessary permits from the Somerville Fire Department, Police Department, Electrical Department, Water Department, Department of Public Works, Massachusetts Water Resource Authority, Massachusetts Department of Environmental Protection and all other regulatory agencies and/or inspectional authorities having jurisdiction are obtained and paid for by the Contractor or its subcontractor (s) as appropriate.

1.2 PERMITS OBTAINED BY THE CONTRACTOR

A. The Contractor or its subcontractor shall be responsible for obtaining; paying for; and complying with, as part of its base Bid, all permits; licenses; certifications; and approvals required for the work of this contract. The Contractor's responsibility includes but is not limited to, all permits required for his equipment, work force, and particular operations such as transportation and storage of fuel, chemicals or other materials and air emission.

B. At a minimum, the Somerville Department of Public Works and Traffic and Parking Department permits that the Contractor shall be responsible for obtaining and complying with include, but are not limited to, the following:

1. Trench Permit
2. Street Opening Permit
3. Sidewalk Occupancy Permit
4. Traffic Management Permit

The City will waive fees associated with Department of Public Works and Traffic and Parking Department permits for this work.

C. At a minimum, the other Permits the Contractor shall be responsible for obtaining, paying for, and complying with include, but are not limited to, the

following:

1. MWRA Construction Dewatering Discharge Permit

D. The Contractor shall be responsible for scheduling and coordinating inspections and receipt of local, state, or federal permits/approvals/certifications for all Work as part of this Contract.

1.3 PERMITS OBTAINED BY THE OWNER

A. The Contractor is solely responsible for the implementation of the permit requirements and shall include as such in the Bid.

B. The Contractor is solely responsible for any punitive action resulting from any violation of the permit.

C. Actual permits, issued by the respective agencies will be considered part of this Contract.

D. The Contractor shall, at a minimum, include compliance with the provisions and requirements of a typical MWRA dewatering discharge permit, and the typical Somerville permits listed above. The Contractor will receive no additional compensation for compliance with any permit requirements.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION

Item 1060.1 – MWRA Dewatering Discharge Permit Fee

METHOD OF MEASUREMENT:
Payment will be made against the allowance based on invoices submitted by the General Contractor on a monthly basis. Incomplete or incorrect invoices will not be approved.

BASIS OF PAYMENT:
The allowance for this item shall be reimbursement to the General Contractor to pay MWRA Dewatering Discharge Permit Fee.

END OF SECTION 01060

SECTION 01063

SEQUENCING OF WORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies construction sequencing requirements for the following work:
    1. General sequencing requirements.

1.2 SUBMITTALS

A. The Contractor or its subcontractor shall be responsible for submitting sequencing plans for the construction activities described in Section 1.1 of this section. Each plan shall describe sequence of activities required to complete work described in Section 1.1 of this Specification Section, indicate duration and schedule of work; indicate work zones and equipment used to complete work; provide traffic and pedestrian management description and plans for each activity. Contractor shall also provide any flow diversion information to the Engineer so that work can be sequenced with the adjacent construction projects.

1.3 RELATED SECTIONS

A. Specification Section 01010 – SUMMARY OF WORK

B. Specification Section 01045 – CUTTING AND PATCHING

C. Specification Section 01390 – PRECONSTRUCTION SURVEY

D. Specification Section 01570 – MAINTENANCE AND PROTECTION OF TRAFFIC

E. Specification Section 02500 – PAVING AND SURFACING

1.4 DEFINITIONS

A. Street: A section of continuous roadway from its intersection with a major roadway to its intersection with a second major roadway.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 GENERAL SEQUENCING REQUIREMENTS

A. The Contractor shall sequence the work with the following general requirements:
   a. The Contractor shall have a duration of two consecutive work weeks within the timeframes indicated in the Division 0 documents to perform the work and reach substantial completion. Within the indicated timeframe, the City shall allow a 2 week road closure and detour, during which the Contractor complete the work.
   b. All subsurface and surface work to be completed between the hours of 7a-8p using detours as shown on the contract drawings. Contractor to coordinate with adjacent businesses for traffic, parking, and deliveries to gain access during this work.
   c. Surface Restoration work shall proceed following all subsurface work on each street.
   d. When developing traffic management plans, one direction streets shall not be permitted to be reversed in traffic directions.
   e. Construction shall occur in a manner such that access to local businesses is provided.

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01063

SECTION 01070

ABBREVIATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms or abbreviations which may appear in these Specifications shall have the meanings indicated herein.

1.2 ABBREVIATIONS

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	American Disabilities Act
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association or American Parquet Association, Inc.
API	American Petroleum Institute
APWA	American Public Works Association
ARI	Air-Conditioning and Refrigeration Institute
ASCE	American Society of Civil Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials

AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BHMA	Builders Hardware Manufacturer's Association
CABO	Council of American Building Officials
CDA	Copper Development Association
CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DCDMA	Diamond Core Drill Manufacturer's Association
DCR	Department of Conservation and Recreation
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FCI	Fluid Controls Institute
FM	Factory Mutual System
FPL	Forest Products Laboratory
HI	Hydronics Institute
HPMA	Hardwood Plywood Manufacturers Association
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISDSI	Insulated Steel Door Systems Institute
ISA	Instrument Society of America
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
MADEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MBMA	Metal Building Manufacturer's Association
MIL	Military Standards (DoD)
MBTA	Massachusetts Bay Transit Association
MHD	Massachusetts Highway Department
MPTA	Mechanical Power Transmission Association
MSS	Manufacturers Standardization Society
MUTCD	Manual of Uniform Traffic Control Devices
MWRA	Massachusetts Water Resource Authority

MTI	Marine Testing Institute
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NAGDM	National Association of Garage Door Manufacturers
NB	National Board of Boiler and Pressure Vessel Inspectors (alternate NBBPVI)
NBS	National Bureau of Standards (Now NIST)
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association or National Fluid Power Association or National Forest Products Association
NISO	National Information Standards Organization
NLGI	National Lubricating Grease Institute
NMA	National Microfilm Association
NPDES	National Pollution Discharge Elimination
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association
NWWDA	National Wood Window and Door Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PPI	Plastics Pipe Institute
RCRA	Resource Conservation and Recovery Act
RIS	Redwood Inspection Service
RMA	Rubber Manufacturers Association
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SDI	Steel Door Institute
SMA	Screen Manufacturers Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry, Inc.
SPIB	Southern Pine Inspection Bureau
SPR	Simplified Practice Recommendation
SSA	Swedish Standards Association
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Society for Protective Coating
SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
TIA	Telecommunications Industries Association
TPI	Truss Plate Institute

UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WEF	Water Environment Federation
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01070

SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. Specialists, Assignments: In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of regulations governing the Work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of Contract requirements remains with the Contractor.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.

B. References herein to "Building Code" or "Uniform Building Code" shall mean Uniform Building Code of the International Conference of Building Officials (ICBO). Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or

"Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the Work is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or furnishing labor. The Contractor shall bid for the most stringent requirements.

D. The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.

E. Applicable Standard Specifications: References in the Contract Documents to "Standard Specifications" or SSPWC shall mean the Standard Specifications for Public Works Construction, 1991 Edition unless otherwise stated in the specification section.

F. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

G. References herein to "OSHA Standards" shall mean, Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

H. References herein to "MUTCD Standards" shall mean, the latest edition of the Manual for Uniform Traffic Control Devices (MUTCD) published by the US DOT, including all changes and amendments thereto.

I. References herein to "MHD Standards" and/or “MASSDOT Standards” shall mean, the Massachusetts Highway Department Standard Specifications for Highways and Bridges, latest edition, including all changes and amendments thereto.

J. References herein to "ADA Standards" shall mean, the Americans with Disabilities Act of 1990 including all changes and amendments thereto.

K. ASTM: American Society for Testing Materials

L. AASHTO: American Association of State Highway and Transportation Officials

M ACI: American Concrete Institute

N. Final Rule for the Accessibility Guidelines for Recreational Facilities and Outdoor Developed Areas by the Recreational Access Advisory Committee, US Architectural and Transportation Barriers Compliance Board, most recent edition, including all changes and amendments thereto.

O. MAAB: Massachusetts Architectural Access Board, most current edition.

1.3 REGULATIONS RELATED TO HAZARDOUS MATERIALS

A. The Contractor is responsible for ensuring that all work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01090

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SECTION 01108

HEALTH AND SAFETY PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Prepare a Health and Safety Plan (HASP) that meets all applicable state and federal health and safety regulations, including, but not limited to, those listed below. The Contractor shall be solely responsible for developing a HASP suitable for the Contractor's use and all work done by their subcontractors. The Owner, Engineer and/or their representative is not responsible for establishing or enforcing the health and safety requirements of the Contractor, and that nothing herein shall relieve the Contractor from its exclusive responsibility for the health and safety of its employees, and/or its representatives, and/or subcontractors.

B. The Contractor shall be responsible for being aware of all potential hazards at the site, and reviewing existing information which provides evidence of contamination within the limit of the work.

C. A copy of the “Medford/Pearl Sewer Environmental Conditions” dated 1/15/2016 is attached as Appendix A to these Specifications.

D. The Contractor shall also be required to defend, indemnify, and hold the City of Somerville, MA, and the Engineer harmless against any and all claims, liabilities, fines, or penalties arising out of actual or alleged failure of the Contractor and/or its agents, employees, or subcontractors to comply with any health or safety regulation, rule, ordinance, legislation, and/or health and safety plan.

E. All work required in the Specifications regarding development and implementation of a HASP shall be in accordance with State hazardous waste site regulations (310 CMR 40.0018) and OSHA requirements (29 CFR 1910 and 1926). The HASP shall be submitted to the Engineer prior to site mobilization. Work shall not proceed at the site until the Engineer and the City of Somerville have received a copy of the Contractor’s Health and Safety Plan meeting all the requirements specified herein.

F. The Contractor shall be responsible for the construction, maintenance, and dismantling of the decontamination areas specified within the HASP. This includes providing all labor, materials, and equipment to prepare, maintain in working order, and remove the decontamination area, including collection and disposal of decontamination water and solids, and subsequent dismantling and disposal of materials.

G. The Contractor is responsible for establishing, implementing and maintaining of ambient air and dust monitoring programs and all other environmental monitoring programs. All such programs shall be operated by the Contractor whenever there are soils handling construction activities occurring at the site.

H. The Contractor shall be responsible for providing all materials, equipment, and labor associated with applying dust control suppressants, including equipment that shall be required during all soil handling activities, in the event that fugitive dust or excessive odors are encountered.

1.2 DUST CONTROL

A. During excavation of soil and fill material, dust shall be controlled to limit potential spread of contaminants and potential exposure of contaminants to workers and the public. The dust control measures implemented at the site shall be performed in accordance with this Section.

B. During the progress of the work, the Contractor will conduct his operations and maintain the area of his activities, including sweeping and sprinkling of water if acceptable to the Engineer, so as to minimize the generation and dispersion of dust.

1.3 AIR MONITORING

A. Air monitoring shall involve direct reading instruments capable of providing real-time indications of air contaminants to protect on-site personnel and the local population. The Contractor's Site Health and Safety Officer and Superintendent shall be responsible for assuring that monitoring is conducted in an approved manner, that air monitoring/sampling are conducted at a frequency sufficient to ensure accurate assessments of site conditions, and that work practices, engineering controls, and/or personal protective equipment are proper for the conditions.

B. At a minimum, detectors for organic contaminants shall be utilized to monitor on-site and off-site breathing zones and possible sources of potentially hazardous material (e.g., excavations, regrading, etc.). All personnel shall be made aware of the potential hazards and be informed of air monitoring information. Particular attention to air quality shall be made in the work area during earthwork activities to ensure that contaminants do not escape to the atmosphere and affect off-site population, on-site control, working conditions, and personnel protection measures.

C. The Contractor shall keep accurate documentation of all air monitoring, which shall be made available to the Owner and Engineer for review at all times.

PART 2 - PRODUCTS

2.1 HEALTH AND SAFETY PLAN AND CERTIFICATIONS

A. The Contractor shall, prior to the start of work on the site, submit a copy of its site-specific Health and Safety Plan to the Engineer. Submit with the site-specific Health and Safety Plan, a certification that states the following:

1. The Contractor hereby certifies that the Contractor and any workers engaged in work on the project meet the requirements of 29 CFR 1910.120 and the provisions of the American National Standards Institute, Standard Z88.2, for training, medical surveillance, and respirator protection unless the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards. These requirements include, but are not limited to, the following items:

   a. The Contractor's employees have been examined by a licensed physician within the last 12 months, and have been determined to be physically able to perform the work and use the respirator and other protective or safety equipment required for this assignment.

   b. The employees have received health and safety training for working in environments with known and unknown hazards within the past twelve months.

   c. The Contractor has established and is maintaining a respiratory protection program that complies with the provision of 29 CFR 1910.134.

   d. The Contractor maintains appropriate surveillance of the work area conditions and degree of employee exposure or stress.

2. The Contractor shall further certify that only respirators approved or accepted by NIOSH/MSHA shall be provided and used by the Contractor's employees; that each of the Contractor's employees has been properly fitted to the respirators provided by the Contractor, including a test of the face-to-face piece seal; that the Contractor has provided its employees with written procedures covering the use of respirators in dangerous atmospheres; and that the Contractor has established a program for inspection, maintenance, and care of the respirators.

   The certification shall be signed and dated by the Contractor.

3. Work shall not proceed at the project site until the Engineer has received all certification(s) and the Contractor's Health and Safety Plan. Any delays incurred by the Contractor relating to the Health and Safety Plan shall be the responsibility of the Contractor, and constitute no additional costs or claims to the City of Somerville.

PART 3 - EXECUTION

3.1 HEALTH AND SAFETY PLAN CONTENTS, MAINTENANCE, AND IMPLEMENTATION

A. The Contractor's Plan shall address the specific work activities to be conducted by the Contractor. The HASP shall include, but not be limited to, the following:

1. All anticipated hazards based on site conditions, construction activities and the levels of contamination and information presented in previous studies.

2. Provisions for continually updating the Plan in accordance with any new applicable state and federal regulations or any additional information regarding conditions at the site.

3. The following information, shall be included in the HASP in accordance with the minimum standards set forth in 29 CFR 1910.120, 29 CFR 1910.1000, and 29 CFR 1926, and 310 CMR 40.0018:

a. Contractor's Standard Operating Procedures, including Personnel Training and Field Orientation; Personal Hygiene Requirements and Guidelines; Field Monitoring of Site Contaminants; Respiratory Protection Training and 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.

b. Identification of Contractor's Site Safety Officer.

c. Identification of Contractor's Designated Field Personnel.

d. Identification of hazard and risks associated with the Contractor's work.

e. Type of Medical Surveillance Program.

f. List of all hazardous materials that the Contractor shall have on site; the location of the latest Material Safety Data Sheets (MSDS) for each material listed; and the plan for notifying all on-site personnel, including, but not limited to, the Engineer and/or their representatives, of the presence of hazardous materials on site. If there are no hazardous materials to be brought on site, the Contractor shall provide a written statement to the Engineer and/or their representative, prior to initiating work activities, certifying that the Contractor shall not transport, store, or use hazardous materials on site.

B. The Contractor shall keep a copy of the 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, shall 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 implemented.

C. Medical surveillance records, OSHA 40-hour training forms, accident forms, and all other documentation requirements of the Contractor's health and safety plan for personnel working on the site 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.

D. The Contractor shall make available Level C personal protective equipment and clothing, not including respirators, to the Engineer and/or their representative for use during site inspections by the Engineer and/or their representative, up to a maximum of three (3) complete sets per day. 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). The Contractor shall provide a repository for collection of disposed health and safety materials. Collection and disposal of contaminated expendable supplies shall be the Contractor's responsibility.

E. The level of dermal and respiratory protection shall be determined based upon continuous air monitoring to be performed by the Contractor. The Engineer may conduct duplicate air monitoring for quality control purposes. As air monitoring indicates the levels of contaminants in the air, the personal protective equipment shall be determined based upon established standards and the standards set forth in the Contractor's Health and Safety Plan. Regardless, modified Level D protection for all on-site personnel is the minimum project requirement.

F. The Contractor shall be aware of site-specific requirements, such as site security during non-working hours, limited work space, and minimizing the effects of soil excavation, in preparing its health and safety program.

3.2 ROUTINE SAFETY MEETINGS

A. The Contractor shall keep a copy of the HASP on site during all operations, and shall conduct routine health and safety meetings to ensure that all work is being performed in accordance with OSHA regulations, the Contractor's HASP, and prior to initiating a new task, following an incident or following any changes to the HASP necessitated by site conditions. Failure to conduct routine safety meetings may be cause for stopping work at the cost of the Contractor.

PART 4 – COMPENSATION

END OF SECTION 01108

SECTION 01200

GENERAL REQUIREMENTS FOR UTILITY WORK

1200.1	**TEMPORARY UTILITY SUPPORT AND COORDINATION**	**LUMP SUM**
1200.2	**SURVEY CONSTRUCTION LAYOUT AND BASELINE, AS-BUILTS**	**LUMP SUM**

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies general requirements for construction, protection, support, maintenance, and restoration for underground and overhead utilities affected by construction of the Project. This section includes coordination with private utility companies. The Work includes new construction, reconstruction, relocation, and abandonment.

B. The utility works and services that may be affected include, but are not limited to:

1. Storm drain, sanitary sewer, and combined sewer
2. Water distribution and transmission mains
3. Gas distribution
4. Gas transmission
5. Electric power, heat exchange return pipelines, utility poles, and street lighting (underground and overhead)
6. Telephone
7. Traffic signals
8. Fiber optic communications
9. Cable Television
10. Signal communication
11. City fire signal lines and pull boxes
12. Steam

C. This Section shall be used in conjunction with the specific underground utility work sections that apply to the Contract.

1.2 RELATED TECHNICAL SECTION

A. Section 01400 – Quality Control

1.3 WORK BY UTILITY COMPANIES

A. Certain parts of the utility work shall be performed, where shown or specified, by the utility company.

B. For all utilities, with the exception of storm drains, sanitary sewers, combined sewers, water main, and electrical conduit for street lighting, work shall be performed by the respective utility companies.

1. Disconnecting and connecting of storm drains, sanitary sewers, and combined sewers services shall be the Contractor's responsibility as shown on the Drawings or required in the Specifications. In the event the Contractor determines sewer disconnections or connections must be made that are not shown on the Drawings or required by the Specifications, he shall first notify the Owner before performing this work.

2. Disconnecting and connecting of water services shall be the Contractor's responsibility as shown on the Drawings or required in the Specifications. In the event the Contractor determines water service disconnections or connections must be made that are not shown on the Drawings or required by the Specifications, he shall first notify the Somerville Water Department before performing this work

C. Contact the utility companies in advance of construction to allow sufficient time for the utility companies to accomplish the work they are required to perform. Provide the utility company at least thirty (30) days advance notice prior to the scheduled date for commencement of work under this Contract.

D. Work performed by utility companies to facilitate the Work under this Contract, and other work performed by utility companies solely for the convenience of the Contractor, shall be at no additional cost to the Owner.

1.4 DEFINITIONS

A. Abandoned means that use of a utility asset has been discontinued by the utility company.

B. To be abandoned means that use will be discontinued as part of the Work under this Contract.

C. Maintenance means providing continuous service that meets project requirements during construction.

D. Maintain complete-in-place means to protect, support, and otherwise maintain the existing condition and function of a facility during construction.

E. Restoration means replacement of a facility or portions of a facility that have been removed or made inoperative by the Contractor in the performance of the Work.

F. Utility Company means the company, agency, owner, or operator of the facility concerned.

G. Temporary Facility means a facility provided, in lieu of an existing or new facility, to ensure continuity of service. When a temporary facility is not shown on the Contract Drawings, but is provided for the convenience of the Contractor, it shall be constructed at no additional cost to the Owner.

1.5 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTALS

1. Submit working drawings and, if applicable, shop drawings showing the details, procedures, and scheduling for performance of each utility work. Show actual verified field locations of existing utility facilities that are affected by the Work under this Contract; interferences which these facilities present to the new work; location of settlement markers; method proposed to proceed with the construction; and, if applicable, procedures for restoration and method of testing to demonstrate restoration was performed satisfactorily.

2. Submit to the Engineer specifications and drawings describing the method to be used to temporarily support existing subsurface, surface and overhead utilities during construction. Include working drawings that indicate proposed materials and details.

3. Submit to the Engineer for review a detailed excavation procedure for subsurface utilities. At a minimum, the procedure shall include:

a. Equipment to be used for anticipated subsurface utility investigation and excavation.

b. Personnel to be used and designated utility coordinator.

c. Duration and schedule of investigation and excavation.

d. Techniques proposed to isolate and protect existing utilities.

e. Method for the Contractor to provide utility information derived from subsurface investigation to field personnel doing excavation.

f. A disciplinary plan that delineates all steps to be taken as a result of a utility disruption caused by negligence or failure to follow proper procedures or the Contract requirements, including possible removal of Contractor personnel from the site.

5. Submit an emergency action plan outlining procedures to be followed by the Contractor in case of unplanned utility interruptions or unplanned damage to utilities in service. Obtain concurrence from each affected utility company.

a. List Contractor's personnel assigned responsible charge for emergency action on site for each shift, and those on call.

b. List phone notification numbers for each utility company, fire, and police departments, and other relevant agencies.

c. Include copies of utility plans showing the valve or switch locations to isolate each line.

B. Transmit to the Engineer the as-built utility location survey data as specified in Article 3.10 of this Section.

1.6 APPROVAL BY UTILITY COMPANIES

A. All personnel performing work on to expose and support existing utility facilities shall be fully qualified and able to meet the standards of the affected utility company. If the Contractor does not have the required utility experience, Contractor shall retain a specialist firm acceptable to the affected utility company to perform the Work.

B. Prior acceptance of temporary support methods for each affected utility facility shall be obtained by the Contractor from each utility company concerned.

C. Prior permission for disrupting a utility shall be obtained by the Contractor from each utility company concerned.

D. Prior approval for disrupting fire signal lines, high pressure fire water mains and hydrants, and fire service lines shall be obtained from the Somerville Fire Department.

1.7 NOTIFICATION

A. In addition to the initial 30 day utility company notification, the Contractor shall notify the appropriate utility companies and the Engineer at least fourteen (14) days prior to starting any work involving or adjacent to surface, subsurface, or overhead utility facilities.

B. National Grid Gas Requirements:

1. The Contractor shall coordinate and sequence relocations and replacements with National Grid Gas as necessary.

2. If cut-off or connection is expected, notify the National Grid Gas Company Engineering Department four (4) weeks prior to cut-off or connection to gas main.

3. At locations where the sand bedding material of gas mains are excavated and removed by the Contractor, the Contractor shall put back or replace the bedding material, in kind. Crushed stone shall not be used as backfill for bedding material beneath gas mains.

4. Buried gas caution tape shall be replaced if disturbed or removed. In the case of any damage to the tracer wire for the gas main, the Contractor is to notify National Grid Gas prior to backfilling the trench.

5. Immediately notify the Gas Company Engineering Department if surface or subsurface settlement or movement in excess of the design amount is observed, regardless of the proximity to an existing gas facility.

6. National Grid Gas to immediately be notified if gas main or service breaks during construction and the Somerville Fire Department (911) to be called. If an odor is detected, but there is no break, Contractor to notify National Grid Gas only.

7. Existing gas steel mains found within the project area potentially contain asbestos fibers on the coal tar pipe coating of the main. Where required for removal, the Contractor shall use hand tools for removal. Contractor to notify and coordinate removal of pipe with National Grid. National Grid will be responsible for disposing of removed steel mains and the Contractor will be responsible, where required, to remove steel mains with use of hand tools.

C. Algonquin\Spectra Gas Requirements

1. Contractor shall submit notifications in accordance with Algonquin's Requirements for Construction Near Company Pipelines. Refer to Section 2 of Appendix C to these specifications.

1.8 STANDARD SPECIFICATIONS OF UTILITY OWNERS

A. Specifications and construction methods from each utility owner apply to individual utility specification sections.

B. It is the Contractor's responsibility to ensure that, unless otherwise specified, the standards for materials and construction methods required by the utility owner are met.

PART 2 - MATERIALS

2.1 GENERAL

A. Materials for temporary and permanent work shall be of the type, grade, and class specified by reference to utility company standards.

PART 3 - EXECUTION

3.1 GENERAL CONSTRUCTION REQUIREMENTS

A. Unless otherwise noted, conform to the construction standards, specifications, and standard practices of the affected utility companies. Coordinate with each utility company the work to be done by the Contractor and the work to be done by utility company. Ensure continuity of all existing utility services to all users, except when the utility company determines that temporary interruption is acceptable.

B. Unless otherwise indicated, maintain all utility facilities complete in place. Provide temporary support of utilities during construction only by methods acceptable to the utility company concerned.

C. Provide and maintain all temporary facilities required to provide interim utility service when a utility facility is to be relocated and when a utility facility to be replaced is abandoned prior to replacement.

D. Where an existing utility facility is encountered that is not indicated or that is determined to be a different utility facility than that indicated, promptly notify the Engineer. The Contractor is responsible for determining the owner of the facility and the disposition of the facility.

E. All water, sanitary, and storm services must be maintained throughout the project through the use of temporary pumps and piping. Unless otherwise noted, no service interruptions will be permitted.

F. The Contractor shall dewater existing utility manholes and structures prior to beginning construction. Any dewatered material shall be properly treated and disposed.

G. Algonquin\Spectra:

1. Contractor shall comply with Algonquin’s Requirements for Construction Near Company Pipelines. Refer to Appendix C to these specifications including specific requirements in Sections 6 and 8.

3.2 SUBSURFACE UTILITY INVESTIGATION

A. The Contractor shall excavate test pits where indicated on the Contract Drawings and as specified.

3.3 UNSAFE AND UNSUITABLE UTILITY STRUCTURES

A. If, upon exposure, the condition of a facility to be maintained complete-in-place is found to be unsafe, the Contractor shall notify the utility company, for support or for maintenance of service, the Contractor shall replace or reconstruct or coordinate the replacement or reconstruction of the facility with the utility Owner and shall promptly notify the Engineer of additional costs anticipated prior to beginning the work.

3.4 ABANDONED FACILITIES

A. Demolish and remove abandoned utility facilities that interfere with the Work of this Contract. Abandoned facilities that do not interfere with the Work of this Contract may remain.

B. Do not undertake demolition or removal until permission for such Work has been obtained from the utility company.

C. When abandoned facilities are to be left in place, plug or cap the ends of conduits and pipes, and fill with controlled density fill (CDF) unless otherwise indicated. Remove abandoned utility manholes, junction boxes, and similar structures to a minimum depth of 4 feet below finished grade, and puncture or break the bottom slabs of manholes and similar structure to allow drainage. Backfill and compact excavations resulting from removal of utility facilities as required to restore original grade.

3.5 SETTLEMENT OR MOVEMENT

A. In case of settlement or other movement that causes or could cause damage, take immediate remedial measures to correct the conditions and repair the damage.

3.6 ACCESS

A. At all times permit free and clear access to the affected facilities by personnel of the utility companies.

B. Throughout the construction period, maintain access to all utility vaults and structures.

3.7 SERVICE CONNECTIONS

A. Work required for maintaining, supporting, relocating, restoring, and constructing all service connections is included as part of the Work of this

Contract, even though some existing service connections, for which record information is not available, may not be shown on the Contract Drawings.

3.8 REPAIR AND RESTORATION

A. Repair all damage to utilities caused by Work under this Contract. Clean all utility structures of dirt caused by Work under this Contract. Immediately notify the Engineer and the utility company of damage to utilities.

3.9 EXCAVATION AND BACKFILL

A. Perform excavation and backfill in accordance with Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

B. Excavation and handling of contaminated soil is specified in Sections 02080 - SOIL AND WASTE MANAGEMENT, and 02095 – TRANSPORTATION AND DISPOSAL OF SOIL AND FILL.

3.10 CLEANING UP

A. In accordance with Section 01630 – RESTORATION OF GROUNDS AND CLEANING UP, the Contractor shall, upon completion of the Work, remove all temporary construction facilities, equipment, debris, and unused materials, and shall restore the project area and adjacent affected areas to a neat and clean condition.

3.11 AS-BUILT UTILITY LOCATION SURVEY

A. For each new or relocated utility installed, including those installed or relocated by others in the Project Area, perform an as-built location survey by coordinates prior to backfilling the excavation.

C. The survey work, including verification of the existing survey data, shall be performed by a licensed Professional Land Surveyor registered in Massachusetts to accurately record progress of the work throughout the duration of the Contract.

1. The Surveyor is subject to the approval of the Owner. The Contractor shall submit the qualifications of the Surveyor documenting performance of similar scopes of work utilizing software specified below.

2. All coordinates shall be geographically registered in the project datum coordinate system using the control points for horizontal and vertical controls.

3. Horizontal accuracy shall be 0.01 feet.

4. Elevation accuracy shall be 0.1 feet except benchmarks, topography, and structure foundations (including manholes pipe inverts) shall be accurate to 0.01 feet.

5. Digital As-built drawings, including surface data shall be provided in AutoCAD Civil 3D format to match the text styles and line types of the design drawings provided by the Engineer.

6. It is recommended that the Surveyor attend the Preconstruction meeting.

D. The Contractor shall also maintain red line record documents at the site to accurately record progress of the work throughout the duration of the Contract.

1. Contractor shall delegate the responsibility for maintenance of the record documents to one person on the Contractor's staff as approved by the Owner.

2. Changes to the record documents shall be coordinated with adequate and proper entries on each page of the specifications and each sheet of drawings and other documents where such entry is required to show progress and changes properly, including change orders, approved shop drawings, RFIs, and other modifications.

3. Record information shall be updated within 24 hours of installation or survey.

PART 4 - COMPENSATION

Item 1200.1 – Temporary Utility Support and Coordination

METHOD OF MEASUREMENT:
Measurement for payment for Temporary Utility Support and Coordination will be on a percent of the Lump Sum bid calculated by dividing the elapsed time to date by the contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT/INCLUSIONS:
Payment for Temporary Utility Support and Coordination will be based on the bid for this item in the proposal. Under the Lump Sum Price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment and incidentals required to maintain continuity of gas, telephone, electric, telecommunications, cable TV, steam, and privately owned utilities. The work includes all trunk, supply, transmission, service, heat exchange pipelines and main lines impacted by the Work. Under the Lump Sum Price bid for this item, the Contractor shall also furnish all labor, materials, tools, equipment and incidentals to coordinate and/or temporarily support all utilities exposed during the excavation for the installation of the Work; submission of all utility coordination and support work plans and shop drawings; coordinate the protection of and protect all overhead utilities; excavation and relocation of the electric conduit noted on the drawings in coordination with the electric company; and perform all coordination with the utility companies for the relocation,

abandonment, protection, support, and other work required to facilitate the completion of the project. This Item further includes utility location (Dig Safe); provide, install, maintain, and disconnect portable generators to maintain electrical service to dwellings; coordination of construction with existing utility owners and operators; providing access for utility owners and operators to their respective utilities; coordination with the City of Somerville Communications Department; and communicating with affected homeowners and residents.

EXCLUSIONS:
The following items are not included for payment under this item and are included for payment elsewhere; labor, materials, tools, equipment and incidentals required to maintain continuity of water mains; restoration of curbing, sidewalks, and bituminous concrete pavement; providing by-pass pumping of sanitary sewers and storm drains; and temporarily and permanently relocating sanitary sewers, storm drains, water and services for sanitary sewers, storm drains and water mains.

Item 1200.2 – Survey Construction Layout and Baseline, As-Builts

METHOD OF MEASUREMENT:
Measurement for payment for Survey Construction Layout and Baseline, As-Builts will be made on a percent of half of the Lump Sum bid calculated by dividing the elapsed time to date by the contractual construction time limit as proposed by the Engineer. The remaining half of the Lump Sum bid will be made upon acceptance of the As-Builts by the Engineer.

BASIS OF PAYMENT:
Payment for Survey Construction Layout and Baseline, As-Built will be based on the bid for this item in the proposal. Under the Lump Sum Price bid for this item, the Contractor shall furnish all labor, professional services, technician, equipment, and incidentals for the Contractor to establish survey control, survey construction baseline and layout and provide as-builts as required and not included in other pay items. The work includes, but is not limited to, survey control, survey construction baseline and layout and as-builts.

END OF SECTION 01200

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes general requirements for project submittals by the Contractor.

1.2 PROGRESS REPORTS, RECORDS AND DATA

A. The Contractor shall submit to the Owner such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as outlined in Section 01311 – SCHEDULING AND REPORTING and as the Owner may request concerning work performed or to be performed under this Contract.

1.3 OPERATION AND MAINTENANCE MANUALS

A. Adequate operation and maintenance information shall be supplied for all equipment requiring maintenance or other attention. The equipment supplier shall prepare a project specific operation and maintenance manual for each type of equipment indicated in the individual equipment sections. Parts lists and operating and maintenance instructions shall be furnished for other equipment not listed.

B. Operation and maintenance manuals shall include the following:
   1. Equipment function, normal operating characteristics, and limiting conditions.
   2. Assembly, installation, alignment, adjustment, and checking instructions.
   3. Operating instructions for startup, routine and normal operation, regulation and control, shutdown, and emergency conditions.
   4. Lubrication and maintenance instructions.
   5. Guide to troubleshooting.
   6. Parts list and predicted life of parts subject to wear.
   7. As-built outline, cross section, and assembly drawings; engineering data; and wiring diagrams.
   8. Test data and performance curves, where applicable.
   9. Approved shop drawings.

C. The operation and maintenance manual shall be submitted prior to the date of shipment of the equipment. After review and approval by Engineer, one hard copy and one electronic copy of each operation and maintenance manual shall be submitted 30 days prior to placing the equipment in operation.

1. Hard copies shall be bound in three-ring binders bearing suitable identification. Drawings shall be reduced to 8-1/2x11 or 11x17.
2. Electronic copies shall be in Adobe Acrobat PDF with searchable pages. Drawings shall be bookmarked individually.
3. All final O&M materials shall be labeled with the Equipment name, Project name, City contract number, specification section, manufacturer's name, and date.

1.4 SHOP DRAWINGS, SAMPLES, PROJECT DATA

A. Shop Drawings and engineering data (submittals) covering all equipment and all fabricated components and building materials which will become a permanent part of the Work under this Contract shall be submitted to Engineer for review, as required. Submittals shall verify compliance with the Contract Documents, and shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and the operation of component materials and devices; the external connections, anchorages, and supports required; the performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.

1. Each submittal shall cover items from only one section of the specification unless the item consists of components from several sources. Contractor shall submit a complete initial submittal including all components. When an item consists of components from several sources, Contractor's initial submittal shall be complete including all components.

2. All submittals, regardless of origin, shall be clearly identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Each submittal shall indicate the intended use of the item in the Work. When catalog pages are submitted, applicable items shall be clearly identified and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data. Engineer will not accept submittals from anyone but Contractor. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.

3. All deviations from the Contract Documents shall be identified as deviations on each submittal and shall be tabulated in Contractor's letter of transmittal. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.

4. Contractor shall submit shop drawings electronically. For electronic submittals, drawings and the necessary data shall be submitted electronically to Engineer as specified below. Submittal documents shall be

in black and white unless color is required for the review of the submittal. All electronic files shall be in Portable Document Format (PDF) as generated by Adobe Acrobat Professional Version 7.0 or higher. The PDF file(s) shall be fully indexed using the Table of Contents, searchable with thumbnails generated. PDF images must be at a readable resolution. For most documents, they should be scanned or generated at 300 dots per inch (dpi). Optical Character Recognition (OCR) capture must be performed on these images so that text can be searched, selected and copied from the generated PDF file. The PDF documents shall have a bookmark created in the navigation frame for each major entry ("Section" or "Chapter") in the Table of Contents. Thumbnails shall be generated for each page or graphic in the PDF file.

The opening view for each PDF document shall be as follows:

- Initial View: Bookmarks and Page
- Magnification: Fit In Window
- The file shall open to the Contractor's transmittal letter, with bookmarks to the left. The first bookmark shall be linked to the Table of Contents.

PDF document properties shall include the submittal number for the document title and the Contractor's name for the author. Electronic submittal file sizes shall be limited to 10 MB. When multiple files are required for a submittal the least number of files possible shall be created. The contractor shall transmit submittals and receive the Engineer's submittal review comments via email. Instruction on procedures for transmitting and receiving submittals will be provided after award of the Contract. Facsimiles (fax) will not be acceptable. Engineer will not accept submittals from anyone but Contractor. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.

5. In addition, two hard copies of each *full size* drawing shall be submitted to Engineer and will return two marked copies (or one marked reproducible copy) to Contractor.

6. Engineer's submittal review period shall be 14 consecutive calendar days and shall commence on the first calendar day following receipt of the submittal or resubmittal on the project website. The time required to mail any hard copies of the submittal or resubmittal back to Contractor shall not be considered a part of the submittal review period.

7. Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by Engineer are provided on the resubmittal. When corrected copies are resubmitted, Contractor shall direct specific attention to all revisions in writing and shall list separately any revisions made other than those called for by Engineer on previous

submittals. Requirements specified for initial submittals shall also apply to resubmittals. Resubmittals shall bear the number of the first submittal followed by a letter (A, B, etc.) or a unique identification that indicates the initial submittal and correct sequence of each resubmittal. If more than one resubmittal is required because of failure of Contractor to provide all previously requested corrected data or additional information, Contractor shall reimburse Owner for the charges of Engineer for review of the additional resubmittals. This does not include initial submittal data such as shop tests and field tests that are submitted after initial submittal. Resubmittals shall be made within 60 days of the date of the letter returning the material to be modified or corrected, unless within 30 days Contractor submits an acceptable request for an extension of the stipulated time period, listing the reasons the resubmittal cannot be completed within that time. The need for more than one resubmittal, or any other delay in obtaining Engineer's review of submittals, will not entitle Contractor to extension of the Contract Times unless delay of the Work is the direct result of a change in the Work authorized by a Change Order or failure of Engineer to review and return any submittal to Contractor within the specified review period.

B. When submitted for the Engineers' review, all shop drawings shall bear the Contractor's certification that he has reviewed, checked and approved the shop drawings, that they are in harmony with the requirements of the Project and with the provisions of the Contract Documents, and that he has verified all field measurements and construction criteria, materials, catalog numbers and similar data. The Contractor shall also certify that the work represented by the shop drawings is recommended by the Contractor and the Contractor's Guaranty will fully apply.

C. All samples called for in the Specifications or required by the Engineer shall be furnished by the Contractor and shall be submitted to the Engineer for his review. Samples shall be furnished so as not to delay fabrication, and to allow the Engineer reasonable time for the consideration of the samples submitted.

D. Checking of submittals is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and the satisfactory performance of his work.

E. The Contractor may only proceed with fabrication and construction of items with returned submittals marked "No Exception Taken", "Make Corrections as Noted" or “Noted : No Action Required”. Resubmit submittals if marked "Rejected", "Revise and Resubmit" or "Submit Specified Item."

F. The Contractor shall furnish such samples of material as may be required for examination and test. All samples of materials for tests shall be taken according

to ASTM Specifications or as provided in the Contract Documents.

G. All samples shall be submitted by the Contractor with a covering letter indicating that such samples are recommended by the Contractor for the service intended and that the Contractor's Guaranty will fully apply.

H. All materials, equipment and workmanship shall be in accordance with samples guaranteed by the Contractor and reviewed by the Engineer.

I. Submittals requiring a Certificate of Design will be considered incomplete and not acceptable unless a complete Certificate of Design is submitted.

J. The Certificate of Design requires that the engineer providing the submittal carries Professional Liability insurance meeting the requirements laid out in the "General Terms and Conditions" and additionally meeting the requirements of the "Supplemental General Conditions" to the Contract.

1.5 CONTRACTOR'S ORDER OF CONSTRUCTION

A. The Contractor shall submit schedules and reporting information in accordance with the requirements of Section 01311 – SCHEDULING AND REPORTING.

1.6 CONTRACTOR'S COST BREAKDOWN

A. The Contractor shall submit a schedule of values.

1.7 CERTIFICATE OF DESIGN

CERTIFICATE OF DESIGN

The undersigned hereby certifies that he/she is a Professional Engineer registered in the state of _____ and that he/she has been employed by (Name of Contractor) _____ to design _____ in accordance with Specifications Section _____ for the (Name Project) _____. The undersigned further certifies that he/she has performed similar designs previously and has performed the design of the _____; and regulations and professional practice standards; that his/her signature and Professional Engineer (P.E.) Stamp have been affixed to all calculations and drawings used in, and resulting from, the design; and that the use of that stamp signifies the responsibility of the undersigned for that design.

The undersigned hereby certifies that he/she has Professional Liability Insurance and a Certificate of Insurance is attached.

The undersigned hereby agrees to make all original design drawings and calculations available to the City of Somerville or Owner's representative with seven (7) days following written request therefore by the Owner.

_____	_____
P.E. Name	Contractor's Name
_____	
P.E. Registration Number, State of Registration and Discipline	
_____	_____
Signature	Signature
_____	_____
Title	Title
_____	_____
Address	Address
_____	_____
Telephone	Telephone
_____	_____
Email Address	Email Address

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01300

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SECTION 01311

SCHEDULING AND REPORTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes scheduling and reporting requirements of the Contractor.

1.2 GENERAL

A. The scheduling of the Work under the Contract shall be performed by the Contractor in accordance with the requirements of this Section. The development of the schedule, the cost loading of the schedule, monthly payment requisitions and project status reporting requirements of the Contract shall employ computerized Critical Path Method (CPM) scheduling. Where submittals are required hereunder, the Contractor shall submit an electronic copy and a hard copy of each submittal item.

1.3 QUALIFICATIONS

A. The Contractor shall submit a statement of computerized CPM capability at the First Progress Meeting verifying that either the Contractor has in-house capability qualified to use CPM techniques or that the Contractor will employ a CPM consultant so qualified

1.4 CPM SCHEDULE SUBMITTALS

A. Within 15 calendar days after the commencement date stated in the Notice to Proceed, the Contractor shall submit for review by the Owner an electronic and hard copy of the CPM Schedule. This submittal shall have already been reviewed and approved by the Contractor's Project Manager, Project Superintendent, and the Project Estimator prior to submission. The CPM Schedule shall show a complete interdependence and sequence of construction and project related activities reasonably required to complete the Work. The CPM Schedule shall also describe the activities to be accomplished and their logical relationships and show a discernible Critical Path.

D. Revisions to the Original CPM Schedule: The Owner reserves the right to require that the Contractor adjust, add to, or clarify any portion of the schedule which may later be discovered to be insufficient for the monitoring of the Work, coordinating the Work with the work of other contractors in the area or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions or clarifications.

E. Acceptance: The acceptance of the Contractor's schedule by the Owner will be based solely upon the schedule's compliance with the Contract requirements. By way of the Contractor assigning activity duration and proposing the sequence of the Work, the Contractor agrees to utilize sufficient and necessary management and other resources to perform the work in accordance with the schedule. Upon submittal of a schedule update, the updated schedule shall be considered the "current" project schedule.

F. Submission of the Contractor's progress schedule to the Owner shall not relieve the Contractor of total responsibility for scheduling, sequencing, and pursuing the Work to comply with the requirements of the Contract Documents, including adverse effects such as delays resulting from ill-timed work.

G. Updates and Periodic CPM Schedule Submittals: Following the acceptance of the Contractor's Original Construction Schedule, the Contractor shall monitor the progress of the Work and adjust the schedule to reflect actual progress and any changes in planned future activities. Each schedule update submitted must be complete including all information requested in the original schedule submittal. Each update shall continue to show all work activities including those already completed. These completed activities shall accurately reflect the "as built" information by indicating when the work was actually started and completed.

H. Neither the submission nor the updating of the Contractor's original schedule submittal nor the submission, updating, change or revision of any other report, curve, schedule or narrative submitted to the Owner by the Contractor under this Contract, nor the Owner's review or acceptance of any such report, curve, schedule or narrative shall have the effect of amending or modifying, in any way, the Contract completion date or milestone dates or of modifying or limiting, in any way, the Contractor's obligations under this Contract. Only a signed, fully executed change order can modify these contractual obligations.

1.5 INCLEMENT WEATHER PROVISIONS OF THE SCHEDULE

A. The Contractor's construction schedule shall include lost days on the CPM schedule's critical path due to inclement weather during an active period of Work. The Contractors schedule shall also include lost days due to an inclement weather related shutdown at the requirement of the Owner.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01311

SECTION 01390

PRE CONSTRUCTION SURVEY

1390.1 INTERNAL AND EXTERNAL BUILDING INSPECTION LUMP SUM

PART 1 - GENERAL

1.1 SUMMARY:

A. Work under this section includes photography and video recording of surface conditions of interior and exterior of building and exterior areas and structures as indicated in the Contract Drawings or as otherwise required by the Geotechnical Engineer before commencement of the work.

B. Perform post-construction survey at properties where a damage claim has been reported. Assume 2 properties require post-construction survey.

1.2 QUALITY ASSURANCE

A. Qualifications

1. The company engaged to perform the pre and post construction surveys shall, during the past 5 years, have successfully completed photographing and video recording three construction projects of similar scope and dollar value as the construction project which is the subject of this Contract.

2. Qualifications of the firm performing the pre- and post-construction building surveys:

a. Inspections shall be performed by or under the direct supervision of a Registered Professional Engineer, licensed in the Commonwealth of Massachusetts. This individual shall have at least 3 years' experience in the inspection or design of residential and commercial structures.

1.3 SUBMITTALS:

A. Submit in accordance with Section 01300 Submittals.

B. Submit prior to performing any photography and video work, the qualification of the firm performing the photography and video recording work. Include a list of projects to demonstrate compliance with paragraph 1.2.A.1 of this section. For each project, include project name, location, owner, year(s), name

of general contractor, and current address and phone number of the owner or owner's representative.

C. Submit copies of all videos as follows:

1. Two (2) copies of the pre-construction video to the ENGINEER within 30 days after Notice to Proceed.

2. Format shall be DVD.

D. Submit copies of photographs as follows:

1. Photographic compact discs (photo CDs) of each view. Submit two photo CDs.

E. Submit written release(s) from the photographer and photographic studio covering all videos, photographs (prints), and photo CDs of images taken as specified. Submit each release at the time of development of the subject video and/or photograph.

F. Within 30 days of Notice to Proceed, submit the qualifications of Professional Engineer(s) that will perform the "before and after" condition survey of building as specified in paragraph 3.1 of this section.

G. Within 30 days of Notice to Proceed, submit four (4) copies of pre-construction ("before") "Building Condition Survey" reports and videos (on DVD) of buildings as indicated in paragraph 3.1 to ENGINEER.

1.4 SEQUENCING AND SCHEDULING:

A. Pre-construction photography and video, including pre-construction building surveys and exterior areas shall be completed prior to beginning of construction.

B. Post-construction building condition survey work: only of areas where a damage claim has been reported.

C. Dates for other photography and video recording at the site shall be coordinated with the ENGINEER.

1.5 WORKSITE CONDITIONS

A. Right of entry for building conditions survey: Contractor shall obtain the right of entry for all structures to be surveyed.

1. Prior to contacting the individual building owners, the ENGINEER will provide a general notice describing the project and the need to obtain access to each building. The Contractor shall not contact individual

building owners until at least 2 weeks after the ENGINEER has provided notice to the building owners.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Video:

1. Format: Digital recorded and submitted on DVD.

2. Video Identification:
   a. Video Number:####-yyy

      Where: ### = Contract Number
      yyy = video number, sequentially numbered 001

      b. Clearly identify and indicate:

         1) Project name and Contract No.

         2) General description of the subject(s) of the video.

         3) Date (s)

3. Log of Videos: Provide a binder with the log of all videos taken for this Contract. Format of the log shall be tabular and shall include a description of each video that includes all the information specified in paragraph 2.1.A.2 of this section.

B. Photographs:

1. Electronic format: photographic compact disc (photo CD).

2. Identification:

   a. Photograph number: ####-yyy-zz

      Where: #### - Contract Number
      yyy – Building identifier from 001
      zz – Photograph number, sequentially numbered from 01 for each building

   b. Clearly identify and indicate:

      1) Project name and Contract No.

2) The location (e.g., station number) where the photograph was taken.

3) The view/orientation of the photograph (compass direction and vertical declination of view (e.g., horizontal, looking up, looking down, etc.)

4) Identification of main features in view.

5) Any other data and information pertinent to the purpose and identification of the exposure.

6) Date and time.

7) Weather conditions (for exterior shots).

3. Print Filing Binder:

a. Include the photo CD(s) that contain the digital images of all the photographs each photo CD shall be numbered with a sequential number.

4. Master Log of Photographs:

a. Include a separate tabular log of all photo CD(s) and cross-reference which photo numbers are included on each photo CD.

PART 3 - EXECUTION

3.1 GENERAL PHOTOGRAPH AND VIDEO RECORDING:

A. General:

1. All views shall contain a relative dimension reference that is easily recognizable. In views where dimensions are critical use a recognizable measuring device such as folding ruler or measuring tape in a manner that the markings are clean and sharp in the photograph and the device located in close relationship to the subject of the photograph.

B. Detailed examination of the above grade structures, buildings and outside areas shall include documentation of exterior visual survey of the property, on-site improvements and plantings; detailed video inspections of the exteriors of buildings; color photographs of the exteriors showing visually evident structural faults, including but not limited to:

1. exterior façade and interior for structures indicated in the Contract Drawings.

2. location and size of cracks in exterior/interior walls, especially instances of cracked or missing plaster within defined survey areas;

3. damaged masonry or roofing with the defined survey areas;

4. damaged windows or doorway within the defined survey areas;

5. walls which are not vertical within the survey area;

6. damage to foundation, including exterior/interior basement walls; and tightness of fit of doors and windows with respective jambs.;

7. sidewalks, paved areas, utility poles, stairways, patios, retaining walls, and landscaped areas.

PART 4 – COMPENSATION

Item 1390.1 – Internal and External Building Inspections

METHOD OF MEASUREMENT:
Measurement for payment for Internal and External Building Inspections will be based on the the lump sum bid price.

BASIS OF PAYMENT/ INCLUSIONS:
Under the Unit Price for Internal and External Building Inspections, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to complete internal and external building inspections for all buildings adjacent to the work between stations 0+90 and 2+00 on Medford Street and Pearl Street, irrespective of the number of units within a building. Payment under this Item includes, but is not limited to, obtaining Right of Entry(ies), up to 3 documented attempts to notify the property owner(s) via certified mail; video inspection and documentation of internal and external conditions; delivering DVD and report of internal and external inspection; and re-inspection of internal and external building.

END OF SECTION 01390

SECTION 01400

QUALITY CONTROL

1400.1 QUALITY CONTROL AND TESTING ALLOWANCE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes quality assurance and control of installation and manufacturer's field services and reports.

1.2 RELATED TECHNICAL SECTION

A. Section 01200 – General Requirements for Utility Work

B. Section 02210 – Earth Excavation, Backfill, Fill, and Grading

1.3 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 required by the Engineer.

1.4 LAYOUT OF WORK

A. The Contractor shall employ a Massachusetts Registered Land Surveyor acceptable to the Engineer and direct him to establish an initial "Construction Base Line" as indicated on the Drawings. Said base line shall be staked at 25 foot stations. The Engineer shall also provide bench mark information on the Drawings or separately in writing. The Contractor shall do all layout of the work from said base line and bench marks.

B. The Contractor shall employ a Massachusetts Registered Land Surveyor approved by the Engineer and cause him to establish permanent bench marks during the entire progress of the work, to which easy access may be made to determine and assure all lines and grades and to verify same from time to time. The Contractor shall keep on the job a level and transit and allow the Owner's Representative and the Engineer unrestricted use of same at the work site. Such check shall not be considered as approval of the Contractor's work.

C. The Contractor shall maintain the construction base line stakes at all times. Should stakes or marks be destroyed during the course of the work, by the

Contractor or by others, the Contractor shall, at his own expense, provide the services of a Massachusetts Registered Land Surveyor, acceptable to the Engineer, to reestablish such stakes and marks.

1.5 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 as well as those outlined in specifications relating to contaminated and hazardous materials.

1.6 HYDRANTS

A. Fire hydrants on or adjacent to the work shall be kept accessible to fire-fighting equipment at all times.

1.7 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, provide material or product supplier's or manufacturer's technical representative to observe site conditions; conditions of surfaces and installation; quality of workmanship; start-up of equipment; operator training, testing, adjustment, and balance of equipment as applicable; and to initiate operation, as required. Conform to minimum time requirements for start-up operations and operator training if defined in specification sections.

B. At the Owner's or Engineer's request, submit qualifications of the manufacturer's representative 15 days in advance of required representative's service. The representative shall be subject to approval of the Owner and Engineer.

C. Manufacturer's representative shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions. Submit reports within 14 days of observation to Engineer for review.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION

Item 1400.1 – Quality Control and Testing

METHOD OF MEASUREMENT:
Payment will be made against the allowance based on invoices submitted by the General Contractor on a monthly basis. Labor, professional services, technician, and other invoices shall include a breakdown of hours, labor rates, direct expenses all sub-consultant and contractor mark-ups, material costs, shipping, taxes and all other costs included in the request. Incomplete or incorrect invoices will not be approved.

The General Contractor is allowed up to a 5% Mark-up on labor, professional service, technician, and other costs related to testing.

BASIS OF PAYMENT:
The allowance for this item shall be reimbursement to the General Contractor to furnish all labor, professional services, technician, equipment, and incidentals for testing required in this contract and not included in other pay items. The work includes, but is not limited to, testing for: backfill compaction, concrete and Hot Mix Asphalt standard paving compaction testing items.

SPECIAL NOTES/EXCLUSIONS:
Contamination, In-situ Soil density, pipe and manhole testing, water main testing, test pits and all other testing not explicitly called out in this Section will not be paid for under this item and are covered under separate pay items.

END OF SECTION 01400

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SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 PLANT

A. The Contractor shall furnish plant and 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 time stipulated in the Contract. If at any time such plant 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 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 obligations to secure the quality of the work and rate of progress required.

1.2 SUBMITTALS

A. The Contractor shall submit a complete work plan including: proposed hours of operation, sequencing of work, number of shifts, number of work crews, and anticipated conflicts with existing utilities and facilities throughout the project. The work plan shall also include dates for temporary facility service interruption and required utility relocation. The plan shall also include a detailed schedule of all cooperation requirements with owners/operators of existing utilities and facilities.

1.3 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of easements, except by permission of the Owner through right of documents.

1.4 PIPE LOCATIONS

A. Pipelines shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing utilities, structures or for other reasons.

B. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him for laying and jointing different or additional items where required.

1.5 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 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 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.

1.6 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, steel plates, construction and caution signs, concrete barriers, protective 7' tall fencing, lights and other means to prevent accidents to persons, vehicles, and damage to property. The Contractor shall, at his own expense, provide suitable and safe means for completely covering all open excavations and for accommodating pedestrian and/or vehicular travel when work is not in progress. Bridges provided for access to private property during construction shall be removed when no longer required. The length of open trench 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, then special construction procedures shall be taken, such as limiting the length of open trench.

1.7 TEST PITS

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor in accordance with the requirements of the Engineer, as shown on the Drawings, or described in the Specifications, or as directed by the Owner or Engineer. Test pits shall be backfilled and compacted immediately after their purpose has been completed and the surface restored and maintained as required by the Engineer.

1.8 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, but not limited to, poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, fiber optic lines, fire signals, cable television 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 shall notify the owner/operator of the proposed work and proposed protection plan so the owner/operator can review and approve protection measures. The Contractor is required to comply with all provisions of Massachusetts General Laws Chapter 353 entitled "Excavations-Public Ways-Notice Requirements" otherwise known as Dig Safe. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.

B. The Contractor shall bear full responsibility for obtaining all locations of underground structures, utilities, and services. 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. The Contractor will be responsible for the removal and replacement of existing utilities or coordination with the owners/operators of the existing utilities and assisting the existing utilities where required.

D. If, in the opinion of the Engineer, permanent relocation of a utility owned by the City of Somerville is required, that is not shown on the plans or the specifications; he may require the Contractor, in writing, to perform the work. Work so ordered will be paid for as extra work under provisions of the General Conditions. If relocation of a privately owned utility is required, the Contractor will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner and utility, and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies in writing at least seven days (excluding Saturdays, Sundays and legal holidays) before excavating or working in any public way. The Contractor shall notify public utilities 30 days prior to any service call wherever possible.

1.9 WATER FOR CONSTRUCTION PURPOSES

A. The Contractor will be allowed to purchase water from the City of Somerville, MA for construction testing and start-up purposes.

B. The express approval of the Somerville Water Department shall be obtained before water is used. Water shall be metered as specified by the Somerville Water Department. Hydrants shall only be operated under the supervision of Somerville Water Department personnel. Meters and backflow preventers to be procured from the Somerville Water Department.

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 City's Backflow Prevention Inspector before they are put into operation.

1.10 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed Work shall be carefully protected. No driving or wheeling, walking or placing of heavy loads on newly constructed Work shall be allowed. All portions damaged shall be reconstructed, repaired, or replaced by the Contractor at his own expense.

B. All elements of the Work shall be protected in a manner approved by the Engineer. Should any part of the Work 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 as required by of the Engineer.

C. If, in the final or any daily 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 all elements of the Work due to water pressure during and after construction and until such Work is accepted and taken over by the Owner.

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 another manner acceptable to the Owner and 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 in their original location or at a location indicated on the Drawings 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. No trees shall be cut, braced, or damaged without prior notification of the City Arborist.

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 unless a Bid Item has been established elsewhere in these Construction Documents for the express payment of that specific item of Work.

1.12 INSTALLATION OF EQUIPMENT

A. All wedges, shims, filling pieces, keys, packing, red or white lead grout, or other materials necessary to properly align, level and secure apparatus in place shall be furnished by the Contractor. All parts intended to be plumb or level must be proven exactly so. Any grinding necessary to bring parts to proper bearing after erection shall be done at the expense of the Contractor.

1.13 SLEEVES AND OPENINGS

A. The Contractor shall provide all openings, channels, etc., and install anchor bolts and other items to be imbedded in concrete, as required to complete the work under this Contract, together with those required by subcontractors, and shall do all cutting and patching excepting cutting and patching of materials of a specific trade and as stated otherwise in the following paragraph.

B. Subcontractors shall furnish all sleeves, inserts, hangers, anchor bolts, etc., required for the execution of their work. It shall be their responsibility before the work of the Contractor is begun to furnish him with the above items and with templates, drawings or written information covering chases, openings, etc., which they require, and to follow up the work of the Contractor as it progresses, making sure that their drawings and written instructions are carried out. Failing to do this, they shall be responsible for the cost of any corrective measures which may be required to provide necessary openings, etc. If the Contractor fails to carry out the requirements given him, covering details and locations of openings, etc., he shall be responsible for any cutting and refinishing required to make the necessary corrections. In no case shall beams, lintels, or other structural members be cut without the approval of the Engineer

1.14 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 as required by the Owner and 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 required by the Owner and Engineer, occurring previous to the final payment.

1.15 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, including light and power for the construction and engineering field office as well as light and power for dewatering pumps, and trench and staging area lighting.

B. Temporary Heat: The Contractor shall, at his own expense, provide sufficient temporary heat to maintain minimum temperatures specified elsewhere, in all areas designated elsewhere in these documents.

D. Temporary Water: Water for drinking purposes and other usage will be provided by the Contractor at his own expense.

E. 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.

F. Maintaining Operation of the Existing Facilities:

1. The Contractor shall provide temporary utilities and/or cooperate with utilities to maintain full service to the residences and buildings in the project area. The Contractor shall be responsible for careful consideration of the construction scheduling and anticipation of potential interferences 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 may be required include, but are not limited to, electrical power; lighting; heating; cooling; ventilating; telephone; cable television; potable water; fire protection; drainage; sanitary

facilities; trench covers; protection of existing utilities; structures; streams; trees and shrubs; access roads; sewage conveyance; piping; and pumping. The Contractor will be responsible for providing, connecting, and maintaining emergency generators to serve homes in the event temporary electrical services cannot be established by the power company. The Contractor will be responsible to furnish a licensed electrician to connect the houses to the emergency generators, maintain the generators 24 hours a day, and disconnect the houses when service can be reestablished to the power lines. The generators will be provided and maintained at no additional cost to the Owner.

3. The Contractor shall coordinate efforts with the owners and/or operators of the existing facilities to avoid any service interruption. The Contractor shall keep utilities informed of proposed work activity and notify utilities of required work four weeks in advance. The Contractor must schedule work to avoid repeated, unnecessary, or last minute service calls by the owners/operators of existing facilities.

1.16 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 Commonwealth 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.

C. The Contractor must provide sufficient and safe access to existing facilities for the owners/operators of existing facilities to maintain service.

1.17 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, combined, or sanitary sewer systems or into streams or waterways is not permitted.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01500

SECTION 01505

MOBILIZATION

1505.1 MOBILIZATION LUMP SUM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes mobilization consisting of moving all plant and equipment onto the site required for the contractors operations; furnishing and erecting plants, temporary buildings, and project and other construction facilities; erecting project signs and traffic management signs; implementing security features and requirements; all as required for the proper performance and completion of the Work. Mobilization shall further include the following principal items:

1. Developing construction water supply.

2. Providing on-site sanitary facilities and potable water facilities.

3. Arranging for and erection of Contractor's work and storage/staging yard(s).

4. Having all OSHA required notices and establishment of safety programs.

5. Having the Contractor's superintendent at the job site full time and having a project manager. The project manager shall not have superintendent duties.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION

Item 1505.1 - Mobilization

METHOD OF MEASUREMENT:
Payment for Mobilization will be at lump sum price bid for this item in the proposal and shall be payable by percentage complete per the previous listed items when the Contractor is operational on the site. Operational is defined as the substantial commencement of work on site as described in the following paragraph. The Lump Sum price bid for mobilization shall not exceed 2 percent of the Total Amount of Bid.

BASIS OF PAYMENT:

Under the Lump Sum price bid for Mobilization, the Contractor shall move his equipment to the site and prepare to begin construction. Mobilization shall include all costs of initiating the Contract, exclusive of the cost of materials. Mobilization includes securing and constructing a staging area(s) for materials (0.5%); furnishing and paying for all utilities (0.2%), furnishing and installing pre-construction traffic management signage (0.2%); fabrication and installation of project sign (0.1%); distributing contact numbers for Contractor's staff to Owner and Engineer; submission and approval of initial shop drawings (0.2%); submission and approval of Traffic Management Plans (0.2%); submission and approval of initial work plans and sequencing plans (0.1%); installing temporary power, lighting and water for construction purposes (0.2%); implementing security features (0.1%); furnishing and installing temporary sanitary facilities (0.1%); transporting all necessary trucks and construction equipment to the site necessary to begin construction (0.1%); and all other work necessary to start Construction.

END OF SECTION 01505

SECTION 01560

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes temporary environmental controls necessary for the project including dust abatement, rubbish control, sanitation, chemicals, and cultural resources. Snow removal and sweeping of streets and sidewalks are discussed in Section 01570 - MAINTENANCE AND PROTECTION OF TRAFFIC.

1.2 DUST ABATEMENT AND CONTROL

A. The Contractor shall prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from dust originating from its operations. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility for the Work. Dust abatement measures shall include but not be limited to spraying water, applying calcium chloride, or placing temporary pavement on and around trenches and at work sites.

B. During excavation of soil/fill material dust shall be controlled to limit potential spread of contaminants and potential exposure of contaminants to workers and the public.

C. Ambient dust levels at the site shall be monitored by the Contractor prior to construction. During construction, real-time dust monitoring shall be conducted during any soil/fill handling activities. 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, the Contractor shall perform additional measures to reduce the total dust concentrations.

D. Nuisance dust levels may be encountered during regrading activities and excavation. 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. The Contractor shall refer to Section 02080 - SOIL AND WASTE MANAGEMENT for the Dust, Vapor and Odor Control Plan

submittal requirements. At a minimum, the Contractor shall provide clean water, free from salt, oil, and other deleterious materials.

E. Areas of exposed earth to be excavated shall be lightly sprayed with water before excavation. Additional water spray may be utilized only when any indication of excessive dust is observed. The Contractor shall minimize the use of water within the limits of excavation.

F. Access roads shall be sprayed with water and/or calcium chloride on a regular basis to minimize the generation of dust.

G. In addition to the mechanical and hand sweeping performed daily by the Contractor, the Contractor shall employ a professional sweeper to power sweep the Project area at completion of construction.

1.3 RUBBISH CONTROL

A. During the progress of the Work, the Contractor shall keep the Site and other areas used by it in a neat and clean condition and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Site and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the Site in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

B. In the event that the Contractors work zone restricts municipal trash or recycling collection or makes it difficult for residents to bring trash or recycling to the street, the Contractor shall collect all trash and recycling within the work zone and transport it outside the work zone for municipal collection. Return trash and recycling receptacles back to respective properties.

1.4 SANITATION

A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

B. Sanitary and Other Organic Wastes: The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the Site in a manner satisfactory to the Work and in accordance with all laws and regulations pertaining thereto.

1.5 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.6 CULTURAL RESOURCES

A. The Contractor's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archaeological, or cultural resources (hereinafter called "cultural resources").

B. The Contractor shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.

C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:

1. The Engineer will issue a Field Order requiring the Contractor to cease all construction operations at the location of such potential cultural resources find.

2. Such Field Order shall be effective until such time as a qualified archaeologist can be called to assess the value of these potential cultural resources and make recommendations to the State Historic Preservation Office.

D. If the archaeologist determines that the potential find is a bona fide cultural resource, at the direction of the State Historic Preservation Office, the Contractor shall suspend work at the location of the find under the provisions for changes contained in the General Conditions.

1.7 NOISE CONTROL

A. The Contractor shall comply with the City of Somerville Noise Ordinance.

B. 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 (OSHA) regulations.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01560

SECTION 01568

EROSION CONTROL, SEDIMENTATION AND CONTAINMENT
OF CONSTRUCTION MATERIALS

1568.1 SEDIMENTATION AND EROSION CONTROL LUMP SUM

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall provide all work and take all measures to control soil erosion resulting from construction operations, prevent flow of sediment from construction site.

1.2 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTAL PROCEDURES:

1. Two weeks prior to the start of the work, the Contractor shall submit for review, a plan with detailed sketches showing the proposed methods to be used for controlling erosion during construction.
2. Contractor shall submit manufacturer's literature describing products, installation procedures, and routine maintenance of the sediment filter device.
3. Contractor shall submit one sample of a sediment filter fabric device as produced by the manufacturer for the City's Approval.

1.3 QUALITY ASSURANCE

A. Use acceptable procedures, including water diversion structures, diversion ditches, settling basins, and sediment filter devices.

B. Operations restricted to areas of work indicated on Contract Drawings.

C. If construction materials are washed away during construction, contractor shall remove materials from fouled areas.

PART 2 – PRODUCTS

2.1 SEDIMENT FILTER DEVICE

A. Sediment filter device shall be manufactured to fit the opening of the catch basin or drop inlet. The sediment filter device shall have the following features:

1. Two dump straps attached at the bottom to facilitate the emptying of the device and shall have lifting loops as an integral part of the system.

2. Yellow restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls. Yellow restraint cord is also a visual means of indicating when the sack should be emptied.

3. Fabric shall consist of a woven polypropylene geotextile and be sewn by a double needle machine, using a high strength nylon thread.

4. Sediment filter device shall have a certified average wide width per ASTM Standard D-4884 standard of 165 lbs/in.

5. The Contractor shall remove and restore sediment filter devices for anticipated weather events as required by the City or the Resident Engineer.

PART 3 – EXECUTION

3.1 GENERAL

A. The Contractor shall not discharge chemicals, fuels, lubricants, bitumen, raw sewage, and other harmful waste into or alongside any body of water or into natural or manmade channel.

B. It is the intent of these Specifications to prevent the unnecessary occurrence of sedimentation or siltation of waterways and private properties. In the event the sedimentation or siltation prevention measures used by the Contractor prove to be inadequate as determined by the Owner and Engineer, the Contractor shall be required to adjust his operations to the extent necessary to prevent any such sedimentation or siltation from occurring.

3.2 INSTALLATION

A. The Contractor shall protect catch basins by installing sediment filter devices as specified in this Specification in every catch basin within and downstream of the project limits.

B. The Contractor shall install the sediment filter device before any work begins and shall place the device so that it is flush with the material around the frame of the grate of the catch basin structure. The Contractor shall be responsible for maintenance and placement of the strap lift holes to ensure that they do not become a hazard for pedestrians.

C. The Contractor shall maintain the sediment filter device and remove the collected debris as required by the Engineer. If any material is lost in the removal of the sediment filter device, then the Contractor shall be responsible

for cleaning of the catch basin. The Contractor shall inspect the position of the device to ensure that the sediment filter device will work properly during any heavy rain or any storm greater than a 10 year flood.

E. Existing natural drainage patterns and vegetative cover shall be preserved to the maximum possible extent.

F. The Contractor shall use temporary vegetation, mulching, gravel, and paving to protect areas exposed during construction. He shall minimize the amount of bare earth exposed at any one time during construction, and he shall also minimize the length of time bare earth is exposed.

H. Water that is being pumped from the trenches or excavations shall not be pumped directly into water courses or pipe conveyance systems. At a minimum, sedimentation control measures shall include portable sedimentation tanks, pumps, and piping, or other means acceptable to the Owner and Engineer to meet the water quality parameters specified in both the Dewatering Permits and these Specifications, whichever is more stringent.

I. Spoil resulting from the trench excavation shall be leveled or removed to permit free entry of water from adjacent land surfaces without excessive erosion or harmful ponding.

PART 4 – COMPENSATION

Item 1568.1 – Sedimentation and Erosion Control

METHOD OF MEASUREMENT:
Measurement for payment for Sedimentation and Erosion Control will be on a percent of the Lump Sum bid calculated by dividing the elapsed time to date by the contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT/INCLUSIONS
Payment for Sedimentation and Erosion Control will be based on the bid for this item in the proposal. Under the Unit Price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment and incidentals required to furnish, install, maintain, relocate, and remove all sedimentation and erosion control measures. Under the Unit Price bid for this item, the Contractor shall also furnish all labor, materials, tools, equipment and incidentals to prepare and submit all work plans and submittals; line all existing catch basins with sediment filter devices and remove prior to inclement weather; removal and disposal of all silt and sediment collected from sedimentation and erosion control measures; and all other items of work not specifically included herein or elsewhere required to furnish, install, maintain, relocate, and remove sedimentation and erosion control devices as specified and required.

END OF SECTION 01568

SECTION 01570

MAINTENANCE AND PROTECTION OF TRAFFIC

1570.1	**TRAFFIC AND PEDESTRIAN MANAGEMENT**	**LUMP SUM**
1570.2	**REMOTE CONTROLLED CHANGEABLE MESSAGE SIGN**	**UNIT WEEK**

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, equipment, and materials and perform all operations in connection with the maintenance and protection of vehicular, bicycle, and pedestrian traffic on all roads, state and local, directly or indirectly affected by the construction. The work of this section also includes maintaining access to all properties adjacent to the work.

B. The Contractor is responsible for preparing and submitting a plan for traffic management to the Owner and Engineer, including updates as conditions warrant. The Contractor is responsible for design and implementation of revisions to the traffic management procedures during the course of the project at the requirements of the Engineer and at no additional cost to the Owner.

C. The Contractor shall develop and implement a detailed Traffic Management and Control Plan and obtain approval from the City of Somerville Traffic Department and Department of Public Works prior to proceeding with the work.

D. Coordination with MBTA is also required for temporary relocation of bus stops if work zones impact existing MBTA bus stops.

E. Furnish, erect, set, reset, relocate, move, remove, and dismantle sufficient signs, temporary lighting, barrels, flashers, channelizing devices (concrete barriers), fencing, and other traffic control devices on a continuous basis as necessary to protect the work and the general public at all times during construction in accordance with Contractor’s approved Traffic Management and Control Plans. The work of this Section shall also include temporary bridging for traffic across excavations.

F. The design, application, and installation of all traffic control devices required by this section shall conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) published by U.S. DOT, latest edition;

American Disabilities Act (ADA); Massachusetts Architectural Access Board; and the Commonwealth of Massachusetts, Highway Department (MHD), Standard Specifications for Highways and Bridges, latest edition.

G. "Approved by the Owner" throughout this Section shall mean the approval of the Somerville Department of Public Works and Traffic and Parking Department.

H. Traffic control during construction also includes street sweeping and snow removal from sidewalks and streets within the work zone as described in section 3.1 D. Maintaining rubbish and recyclable removal is also required and described in Section 01560 - TEMPORARY ENVIRONMENTAL CONTROLS.

1.2 REFERENCES

A. Reference is made herein to the Commonwealth of Massachusetts, Highway Department, Standard Specifications for Highways and Bridges, latest edition. References made to particular sections or paragraphs in the Standard Specifications for Highways and Bridges shall include all related articles mentioned therein.

B. Manual of Uniform Traffic Control Devices Part VI Standard and Guides for Traffic Controls for Streets and Highway Construction, Maintenance, Utility and Incident Management Operations, latest edition.

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Traffic Management and Control Plan: Before starting any work under this Contract, the Contractor shall prepare a plan that indicates construction equipment movement and the traffic routing proposed by the Contractor during the various stages and time periods of the work, and the location of temporary pedestrian, bicycle routes and construction facilities, temporary barricades, signs, drums, and other traffic control devices to be employed during each stage and time period of the work, to maintain traffic and access to abutting properties. Particular care shall be taken to establish and maintain methods and procedures that will not create unnecessary or unusual hazards to public safety. The Plan shall be submitted a minimum of four weeks prior to the start of construction for acceptance by the Engineer and approved by the Owner and the City prior to start of Work. The Plan shall be reviewed on a daily basis with the Engineer during construction. The Plan shall include procedures for the Contractor to coordinate daily with the Owner and City Departments (Department of Public Works, Traffic and Parking Department, Police, Fire, and Emergency Medical Services).

2. Temporary Pedestrian Access Ramp Work Plan, Temporary Pedestrian Protection Work Plan and Temporary Pedestrian Detour Plan: Contractor shall provide a work plan detailing the location and layout of ramps and their protection, type of ramps and protection to be used with manufacturer's information, and duration the ramps and protection will be utilized. All pedestrian detours required shall be submitted for approval with these plans.

B. Shop Drawings shall be submitted for review four weeks prior to start of construction. Thereafter, the Contractor shall submit to the Engineer updated Traffic Management and Control Plans a minimum of 10 working days prior to the start of construction at any new location or updates required in the work zone resulting from progress of Work throughout the duration of construction.

1. Submit complete shop drawings and work plans for staged construction and traffic movement including temporary vehicle, pedestrian, and bicycle as needed, certified by a Professional Engineer registered in the Commonwealth of Massachusetts.

2. Show on the shop drawings all materials, dimensions, sizes, and methods of installation.

3. Safety Signing for Construction Operations: The Contractor shall submit temporary pedestrian, bicycle, and traffic management sign placement and sign size sketches showing the proposed sign setups intended to be used to provide the necessary traffic control and protection during the progress of work, plus the sign and legend size and layout. These sketches shall be submitted to the Engineer, Owner and City for review and approval before work begins.

4. When a detour or by-passing of vehicular traffic is anticipated, the Contractor shall submit for approval by the Engineer, Owner and City, a detour plan showing the proposed alternative routes and location, size, and type of signs and traffic controls to be used. The traffic routing through or around the Work and provisions for control of same shall be approved by the Engineer, Owner, and City.

5. The Contractor shall submit a Truck and Hauling Route Work Plan for all proposed truck routes prior to mobilizing. No trucking or hauling will be allowed without the approval of the City of Somerville. No trucking or hauling will be allowed outside the proposed routes without the prior approval of the Engineer, Owner, and City. The Contractor is responsible for obtaining all permits and permissions. The Contractor is further responsible for obtaining approval for and coordinating parking restrictions required to facilitate trucking and hauling.

1.4 SPECIAL REQUIREMENTS

A. The Contractor shall provide access for fire apparatus and other emergency vehicles through the work zones to abutting properties at all times.

B. At the end of each workday, where trenches in areas of public travel are covered with steel plates, each edge of the plates shall be either beveled or protected by a bituminous concrete ramp as accepted by the Engineer. Temporary bituminous patching material may be used to construct the ramps. The cost of patching materials, and their maintenance and removal, will be considered incidental to the Traffic Management item with no separate payment elsewhere. Plates shall be pinned or welded together to eliminate movement, noise or vibration.

C. Open excavations adjacent to the traveled way or shoulders shall not remain open through non-work hours unless steel plated for the passage of heavy vehicles or protected by concrete barricades or barriers and specifically authorized by the Owner, City and Engineer.

D. Do not block more than one-side of the roadway at a time when making open cut or other street crossings unless otherwise approved.

E. The Contractor shall be responsible for the costs in obtaining all permits to perform the Work.

F. At least one serviceable driveway access to all residences and businesses within the project shall be maintained at all times unless otherwise approved.

G. The Contractor shall provide temporary lighting to properly illuminate the work area and approaches in the event of nighttime work.

H. The Contractor shall not allow unnecessary idling of trucks and/or equipment throughout the entire project area. The City of Somerville prohibits idling of trucks and equipment for periods of time exceeding five (5) minutes when not in use.

I. The Contractor shall notify the Somerville Fire and Police Departments of any street closings.

1.5 SEQUENCING AND SCHEDULING

A. All streets within or adjacent to the contract limits, not specifically cited shall have their full roadway widths available for traffic or permitted parking at all times except for such restrictions as may be approved by the Owner, City and Engineer.

B. Notify the Owner, City and Engineer at least 48 hours in advance (not including Saturday or Sunday or Holidays) prior to the access lane restriction of the

roadway. Notification shall include the date of the restriction, the hours of the day the roadway access will be restricted, and the estimated completion date.

C. The Owner, City and Engineer shall be notified of any re-routing of traffic 48 hours in advance (not including Saturday or Sunday or Holidays). Approval shall be obtained from the Owner, City and Engineer prior to any re-routing of traffic (except emergencies).

D. The Contractor shall verify street sweeping schedules in the work zone. Delivery related parking restrictions will not be permitted on days where street sweeping is scheduled unless otherwise approved.

1.6 HAULING AND TRUCK ROUTES

A. The Contractor is advised that all roads and bridges within or adjacent to the project shall be subject to legal loads, heights of vehicles and vehicle type / use restrictions. The Contractor is responsible for understanding the restrictions and obtaining all necessary permits.

B. The Contractor is advised that no agreements have been made by the Owner, the City of Somerville, MassDOT, or with surrounding cities or towns 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, towns or agencies concerning hauling over city or town roads and bridges.

1.7 STORAGE OF MATERIALS, PARKING OF CONSTRUCTION EQUIPMENT AND WORKER PARKING

A. No material shall be stored within the work area or on adjacent roadways or residential streets except that which is needed to complete the work for that day.

B. Construction workers shall park their vehicles within the work zone during work hours, and remove them thereafter. Parking outside the work zone will be required if the vehicles obstruct traffic flow.

C. The Contractor shall park construction equipment within the work zone and protect equipment with barriers or barricades. Parking outside the work zone will be required if the equipment obstructs traffic flow.

1.8 BARRICADES, WARNING SIGNS AND OTHER PROTECTIVE DEVICES

A. Install, inspect, remove, maintain, and reset all temporary construction controls as frequently as required and in accordance with an approved construction staging sequence and traffic management plan.

B. Regulatory and warning devices shall be subject to removal, replacement and repositioning as often as necessary, and as directed by the Owner and Engineer.

C. Temporary pavement markings and devices shall be used as shown on the approved plans and as required by MUTCD and ADA standards for traffic control and pedestrian safety.

1.9 POLICE DETAILS SERVICE

A. Uniformed City, Municipal, or State police officers shall be utilized to maintain safe traffic flow throughout the construction period. A Police Detail is to be present during all construction activity. Scheduling Police Details shall be the responsibility of the Contractor. To schedule a detail officer, call (617) 349-3350.

B. The Somerville Police Department requires 24-hour advance notice to obtain a Police Detail, except in emergencies and 4-hour advance notice to cancel a detail. Contractor shall use as many police details as needed to ensure the safety of pedestrians and traffic at all times.

C. The Contractor shall coordinate all work with the police officers including but not limited to: locations of work, delivery of materials, equipment movement, required traffic management and schedules.

D. The Contractor must submit all signed detail forms to the project managers or engineer, so that Public Works can pay all submitted and approved Police Detail invoices. Any invoices that are not approved will be the responsibility of the Contractor to pay.

E. The City of Somerville Police Department shall bill the City of Somerville Department of Public Works or whatever department has oversight of the contract for the services of uniformed police officers provided by the Police Department.

F. The Contractor will be required to reimburse Public Works or whatever department has oversight of the contract for Police Details, if the Contractor fails to show for the job or if the Contractor fails to cancel the detail with adequate advance notice.

1.10 PEDESTRIAN TRAFFIC

A. Sidewalks shall be maintained at all times through the construction period. Temporary sidewalks, pedestrian detours and pedestrian and construction facilities shall be constructed as needed to maintain pedestrian traffic and business access. The Contractor shall anticipate that temporary pavement markings (paint or tape) will be required in order to comply with this provision.

B. Pedestrian access shall be provided to abutting land uses and businesses at all times, as approved by the Owner, City and Engineer and in accordance with MUTCD and ADA requirements.

C. Unobstructed walkways of 4-feet minimum width, unless otherwise approved by the Owner, City and Engineer shall be provided at all times.

D. Temporary pedestrian walkways shall be separated from roadway and construction areas by barricades and fence as approved by the Owner, City and Engineer.

E. The Contractor shall be notified by telephone of any location not providing adequate pedestrian access. The Contractor shall acknowledge notification of the call within one (1) hour by contacting the Project Engineer or the Public Works Dispatcher at (617) 666-3311.

F. The Contractor shall respond to the work site within one and a half (1.5) hours of acknowledged notification with sufficient equipment and labor to perform the required work.

G. The Contractor's failure to respond within the specified response time twice within the Contract time will result in a permanent deduction of $250.00 from Contract payments due.

H. The Contractor's failure to respond within the specified response time three times within the Contract time will result in an additional permanent deduction of $400.00 from Contract payments due.

I. The Contractor's failure to respond within the specified response time four or more times within the Contract time will result in an additional permanent deduction of $500.00, per each additional occurrence, from Contract payments due.

J. Continued failure to provide adequate pedestrian access may result in the City terminating the contract in accordance with the General Terms and Conditions of the Contract.

1.11 VEHICULAR CONTROL REQUIREMENTS

A. The Contractor shall meet the following conditions, unless otherwise specifically approved by the Owner, City, and 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, City and Engineer and in accordance with the requirements of the Owner and City and in conformance with MUTCD requirements.

2. The Contractor shall be responsible for necessary coordination with the City departments affected by the project.

3. Traffic control devices and signs shall be removed, demounted or properly covered for those periods of the day not in use.

4. The Contractor shall coordinate the work with the schedules of City Rubbish and Recycling Collection trucks and delivery trucks to the adjacent stores and property owners so as not to impede their access, and cooperate with delivery personnel to facilitate deliveries to properties within the work zone.

5. No operations shall be conducted, including the loading or unloading of equipment or materials, on or near the traveled lanes or road shoulders without first erecting warning signs and channelizing devices. These precautions shall be maintained at all times while work, loading and unloading is in progress.

6. 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 plans or the MUTCD, will require prior approval.

7. 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.

8. Work requiring overnight lane closures shall not begin until all materials required for the completion of each nights work are delivered or available to the project site, unless otherwise approved by the Owner, City and Engineer.

9. Accesses to buildings shall be maintained at all times.

10. Any blocked disability parking spaces to be temporarily relocated to another location within a reasonable distance from the permanent space.

11. Work operations shall not be performed on the roadway in such a manner that traffic is obstructed or endangered simultaneously from both sides of the roadway unless otherwise approved.

12. 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 4-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.

13. 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 4-feet from the traveled way in pre-approved areas unless specifically permitted.

14. Each driver of any vehicle or piece of equipment used on this contract shall be furnished written instructions concerning the manner of operation for that vehicle or piece of equipment. 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.

15. Temporary signs and channelizing devices shall not be set up in inclement weather.

16. The Contractor shall furnish 60-inch x 30-inch 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 City and/or Engineer. The color, type of sheeting and size of lettering shall conform to that of the permanent construction signs.

17. The Contractor shall furnish, install, and maintain 36-inch x 36-inch approved signs reading ‘”ROUGH ROAD” in advance of all roadway areas which have been cold-planed.

18. The Contractor shall furnish, install and maintain additional temporary cones and barrels, as required by the Engineer, after Traffic Calming devices (horizontal and vertical deflections) have been constructed.

19. The Contractor will be responsible for snow removal within active work zones.

1.12 BICYCLE CONTROL REQUIREMENTS

A. The Contractor shall meet the following conditions, unless otherwise specifically approved by the Owner, City, and Engineer:

1. Bicycle traffic shall be accommodated on all public streets either within bicycle lanes where existing or in vehicular travel lanes.

2. When travel lanes are restricted to less than 14-foot in width warning signage (W11-1/W16-1 combination - Bicycle warning symbol with SHARE THE ROAD plaque) shall be placed warning motor vehicle operators of the presence of bicycles in the roadway.

3. If the disruption occurs in a bicycle lanes over a short distance (approximately 500 feet or less), bicyclists should be routed to share a motor vehicle lane.

4. On projects where the disruption occurs over a longer distance (more than 500 feet), and on busy roadways, a temporary bicycle lane or wide outside lane (at least 14 foot wide) should be provided. If that is not feasible, provide access, including ramps if necessary, for bicyclists to have the option of using sidewalks, except within zones where sidewalk bicycle riding is prohibited by the City.

5. Steel plates:

   When steel plates are used in the travel way warning signage (Warning Steel Plates 100 FT) shall be placed at least 100 feet in advance.

   Steel plates shall be set so there is no vertical lip over 1/4 inch between the plate and adjacent pavement. This shall be accomplished in one of the following ways:

   a. Recessing the plate so that the top of the plate matches adjacent pavement (with no lip over 1/4 inch).

   b. Providing bituminous concrete lip painted reflective orange to provide a smooth transition slope up from existing pavement to top of plate.

   Non-slip surface steel plates are preferred for use, and must be used where plates are in an intersection or within a crosswalk.

6. Raised castings: Where raised castings are present after cold planing and/or in anticipation of final paving, provide the following:

   a. Advance warning signs saying: “Caution – Raised Castings Ahead.”

   b. Spray paint reflective fluorescent pink the raised portions of the castings.

7. Cold planing and pavement installation: Where cold planing or the installation of pavement in lifts results in vertical joints greater than 1/4 inch, provide temporary bituminous concrete lip painted reflective

orange to provide a smooth transition slope between the pavement layers.

8. When the roadway or travel lanes narrow due to construction, advance warning signs should be placed at least 20 feet in advance.

9. Narrow cuts that are parallel with the direction of travel create an extreme hazard for cyclists, whose tires could get caught. These should never be made and left in an area where bicyclists will be traveling. If necessary, they should be blocked off and cyclists routed around the hazard. When performing advance pavement cutting for trenching or other roadway excavation, use only saw cutting (approximately 1/4 inch or narrower).

10. Debris should be swept to maintain a reasonably clear riding surface in the bicycle lanes or, where there are no bicycle lanes, the outer 5 or 6 feet of roadway. Promptly remove gravel, debris, litter, sand, stone, and other obstructions from bicycle lanes and travel lanes.

11. Advance construction signs shall not be placed in bicycle lanes and shall not otherwise obstruct bicyclists' path.

12. Temporary ramps for site access ramps. The creation of ramps in the roadway is not permitted unless being created in an area that is otherwise used by on-street parking.

13. Restore pavement markings for bike lanes within 2 weeks of paving.

PART 2 – PRODUCTS

2.1 MATERIAL

A. All barricades, drums, cones and other channelizing devices shall meet the requirements for MassDOT Standard Specifications for Highways and Bridges Section 850 Traffic Control for Construction and Maintenance Operation (Latest Revision) and the Manual of Uniform Traffic Control Devices (Latest Revision).

B. Traffic Control Materials

1. 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 Engineer. Any materials that in the judgment of the Owner are unsatisfactory in appearance or performance shall be removed and immediately replaced by acceptable units.

2. Signs, portable barricades, and drums shall have "High Intensity Encapsulated Lens Reflective Sheeting" in accordance with Section

M9.30.2 of the MHD Standard Specifications for Highways and Bridges and MUTCD requirements.

3. Signs shall be fabricated with "High Intensity Encapsulated Lens Reflective Sheeting". Transparent red, blue, yellow or black opaque paint (ink) may be used over "High Intensity Encapsulated Lens Reflective Sheeting" in accordance with the provisions of subsection M9.30.2, "D.2 Surface", of the MassDOT Standard Specifications for Highways and Bridges, where these colors are specified.

4. Safety signage for construction operations shall consist of furnishing, positioning, repositioning, inspecting, maintaining, and removing regulatory, warning, and guide signs and temporary bus stop signs and taxi stop signs and their supports as approved by the Owner, City and Engineer.

5. Replace all signs and posts, which are damaged or are missing from their location at no additional cost to the Owner.

6. Maintain all signs in a satisfactory manner including the removal of dirt or road film that cause a reduction in sign reflective efficiency.

C. Portable Barricades

1. Furnish, install, relocate, remove, re-install, and maintain portable barricades in accordance with MassDOT and MUTCD requirements or as directed by the Owner, City and Engineer.

2. Portable barricades shall conform with Standard Plate No. 40612 of the MassDOT (Metric Edition). Reflectorized sheeting shall conform to Section M9.30.2, of the MassDOT Standard Specifications for Highways and Bridges.

3. Eight-foot-long units of portable barricades shall be constructed, as needed.

4. Alternating 6 inches (152.4 mil) wide diagonal stripes shall be orange and white and shall slope downward at 45 a degree toward the end by which traffic is to pass. Barricades that block the passage of traffic or designate the end of the traveled way shall have alternating vertical orange and white stripes on the rails.

5. Barricades shall be maintained in good and serviceable condition throughout the duration of the Contract.

6. Temporary pedestrian and construction facilities shall be kept clean and freshly painted as required.

D. Signs, Covered

1. Cover any existing regulatory and warning signs as required by the Owner, City and Engineer.

2. Use a cover approved by the Owner, City and Engineer 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.

E. Traffic Signals

1. Traffic lights shall remain operable at all times throughout the duration of the contract unless approved otherwise by the City.

2. It shall be the Contractor's responsibility to maintain the traffic signal system in continuous and good working order. The Contractor at his expense, shall repair any damage to the traffic signal system resulting from the Contractor's work and notify the Somerville Traffic Department immediately if any traffic controls are damaged.

F. Temporary Precast Concrete Barriers and Work Zone Protection

1. Temporary precast concrete barriers shall be furnished and installed as shown on the approved traffic management plans and where required to protect work zones and excavations which cannot be completed and backfilled or plated within a daily work period. Barriers shall be removed or relocated when no longer required and with the approval of the Owner, City and Engineer.

2. Precast concrete median barrier shall conform with Standard Plate No. 401.15.1 of the MassDOT, as well as be acceptable for temporary pedestrian and construction facilities and signage.

3. Temporary precast barrier for use for temporary pedestrian and construction facilities shall have three sleeves cast in the barrier to receive a post for panel and fence installations.

4. Temporary chain link fence, 4-feet high, shall be erected at work zones abutting pedestrian travel paths and around work zones hazardous to pedestrians in conjunction with precast barriers to form a "safety zone" 7 feet high, or as required by the Owner, City and Engineer. The top 2-feet shall be fixed with plywood panels painted as required by the Owner and Engineer. The barriers and fencing

shall be overlapped at the corners of the excavated area to provide a continuous protective screen.

G. Remote Controlled Changeable Message Signs

1. The internally illuminated changeable message sign shall consist of a magnetically operated matrix, LED, fiber optic, or lamp matrix message board; a diesel engine driven generator power supply; hardware for connection to a 110 volt power source; and a computer operated interface, all mounted on a towable, heavy duty trailer.

2. In the raised position, the bottom of the sign shall be at least 7 feet above the pavement surface. The sign shall be clearly legible for a distance of 900 feet.

3. The sign shall be controlled by an on-board computer. The sign shall automatically change to a pre-selected default message upon failure. That default message shall remain on display until the problem is corrected.

4. The Remote Controlled Changeable Message Sign unit shall be equipped with a security system to prevent unauthorized access. The security system shall allow access only through use of a code or password unique to that sign. If the proper code or password is not entered within 60 seconds of initial telephone contact, the call will be terminated. Remote control for the changeable message sign shall be by cellular telephone and touch tone modem decoder.

5. The lamp matrix, LED or fiber optic sign, shall be equipped with a top-mounted photocell for automatic sign dimming during nighttime use.

6. The remote controlled portable changeable message sign shall be capable of performing all functions at ambient temperatures ranging from -31^{o} to 165^{o}F (–35 to 74^{o}C). There shall be no degradation of operation due to fog, rain or snow. Maintenance shall include periodic cleaning. When not being used the sign shall be stored in a secure area approved by the Engineer.

7. 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.

8. The sign shall be capable of storing 100 pre-programmed messages and be able to display any one of those messages upon call via the trailer-mounted terminal or through the cellular telephone hookup.

9. 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.

10. The trailer shall include 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. The sign shall be capable of being locked in a stowed position while being towed.

PART 3- EXECUTION

3.1 GENERAL

A. Conduct the work in manner that interferes as little as possible with public travel, whether vehicular or pedestrian.

B. Provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel whenever it is necessary to cross, or obstruct roads, driveways, and walks, whether public or private.

1. Give a minimum of 48 hours (not including Saturday, Sunday or Holidays) written notice to owners of private driveways before interfering with them.

C. Provide temporary surfacing on shoulders when necessary.

D. Provide snow removal and street sweeping within the work limits to maintain safe and efficient vehicular and pedestrian traffic flow, including accesses and sidewalks. Contractor shall plow snow out of the work zone in all areas where municipal snow removal is prevented by construction in the opinion of the Owner, City and Engineer. The Contractor shall also remove snow from all sidewalks in areas where construction related activities are occurring or

have recently occurred. The Contractor shall sweep sidewalks, pedestrian walkways and detours, and streets within the work zone on a daily basis. In the event that the Contractors work zone restricts municipal street sweeping in the area, the Contractor shall sweep the restricted streets (including streets outside the work zone) to a point where municipal street sweeping can continue.

E. Sufficient and adequate signs, flashers, channelizing devices, lights, arrow boards and other precautions necessary to protect the work and the public, as determined by the Engineer shall be used at all times during construction.

F. Provide trench bituminous paving repairs on a daily basis, but at intervals no longer than weekly, unless required or allowed otherwise by the Owner, City and Engineer or applicable agency having jurisdiction.

G. Pedestrian access shall be maintained at all times. Access shall be a minimum of 4-feet, clear of all obstructions and meet all American with Disability Act (ADA) requirements. If an existing pedestrian walkway is interrupted, temporary ADA compliant walkways with ramps shall be provided.

H. Contractor shall post "No Parking" signs 48-hours in advance for residential permit parking locations and 24-hours in advance for metered, public, etc. If work does not take place that day, signs must be reposted. Standard Somerville signs shall be used that provide information regarding proposed construction and parking restriction hours. Signs shall be placed at a minimum of 25-foot intervals.

3.2 DETOURS

A. If approved by the Owner, City, and Engineer, construct and maintain detours around the work to maintain traffic over any construction work in a public street, road, or highway where traffic cannot be maintained on alignment of original roadbed or pavement.

B. When detours are allowed, the Contractor shall provide all detour signs approved by the City and/or Engineer with directional arrows. Signs shall be placed at all streets and intersections to provide required direction to allow motorists to return to the street location beyond the detour. The Contractor must submit a written detour plan for the City and/or Engineer's approval prior to implementation of the detour.

C. All detouring and signing shall meet the requirements of the applicable references specified in Parts 1 and 2 above.

D. The Contractor shall provide Police details in the work areas. Contractor shall coordinate vehicle towing with the police.

E. The Detour Plan shall be reviewed and approved by the Owner, City, and Engineer prior to establishing any detours.

F. The Contractor is responsible for the notification of any parties affected by the detour, including, but not limited to Somerville Police, State Police, MBTA, Somerville Traffic Department, and abutting property owners.

3.3 PROTECTION

A. Signs and Channelizing Devices:

1. Locate signs and channelizing devices with lights to protect public thoroughfares which are closed to traffic.

2. Ensure that all open trenches and other excavations have signs, channelizing devices and lights to provide protection to the public.

a. Provide similar warning signs and lights for obstruction such as material piles and equipment.

b. Ensure that the material storage and conduct of the work on or alongside streets causes minimum obstruction and inconvenience to the traveling public.

3. Install and maintain all signs, channelizing devices, lights, and other protective devices in conformity with applicable statutory requirements and as required by the municipalities or agencies having jurisdiction.

4. Illuminate all channelizing devices with flashing lights.

5. No traffic control devices shall be stored adjacent to the roadway.

B. REMOTE CONTROLLED CHANGEABLE MESSAGE SIGN

1. The Contractor shall furnish, place, operate, maintain and relocate the sign as required. When the sign is no longer required, it shall be removed and become the property of the Contractor. The cellular telephone required for the Remote ControlledChangeable Message Sign shall be provided to the Engineer for his use, and subsequently returned to the Contractor. When the sign is not in use, it shall either be turned off or turned from view.

2. Any signs that are missing, damaged, defaced or improperly functioning so that they are not effective, as determined by the Engineer and in accordance with the ATSSA guidelines contained in "Quality Standards for Work Zone Traffic Control Devices," shall be replaced by the Contractor at no cost to the State.

PART 4 – COMPENSATION

Item 1570.1 - Traffic and Pedestrian Management

METHOD OF MEASUREMENT:
Measurement for payment for Traffic and Pedestrian Management will be on a percent of the Lump Sum bid calculated by dividing the elapsed time to date by the original Contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Traffic and Pedestrian Management shall be based on the lump sum price bid for this item in the proposal. Under the lump sum price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to provide, maintain, relocate, and remove Traffic and Pedestrian Management in areas directly or indirectly influenced by construction within the limits of work or outside the limits of work; along truck routes inside or outside the limits of work; as delineated in the approved Traffic and Pedestrian Management Plan, by the MUTCD, ADA, MA AAB, and MassDOT standards; and as further required by the Owner and Engineer. The work includes but is not limited to; fabrication of signage; furnishing and installing signage; mounting and securing signage; maintaining signage; protecting and storing signage not in use; relocating signage; removal of signage; The work further includes, but is not limited to; obtaining permits; coordination with the City Department of Public Works and Traffic and Parking Department; coordination with private property owners within the limits of work; preparing, submitting, reviewing, implementing, and revising traffic management and control plans; work zone layouts, installing, and maintaining traffic management devices based on approved traffic management and control plans including precast concrete and/or triplex barriers with fencing and plywood panels, reflectorized drums, lane delineators, portable barricades, temporary crosswalks, and cones; temporary pavement markings; removal of temporary and existing pavement markings; restoring and maintaining existing pavement markings disturbed within work zone limits (prior to installation of final pavement marking); furnishing, installing, shimming, pinning, maintaining, and removing steel road plates; furnishing, installing, and removing cold patch pavement as necessary or as directed by the Engineer; ordering and coordinating police details; furnishing and installing temporary construction fencing; maintaining roadways and sidewalks inside or outside the limits of work; establishing and dismantling detours; covering existing traffic signs; obtaining, posting and maintaining “No Parking” signs; meeting with police details daily; coordinating police detail locations; and all incidental work, whether listed here or not, required to provide maintenance and protection of traffic and pedestrians.

SPECIAL NOTES ON EXCLUSIONS:
The following items are not included for payment under this item and are included for payment elsewhere; bituminous hot mix asphalt pavement; variable message boards; and Police Details. Police Details will be paid directly by the Owner. Signage damaged as a result of misuse or improper handling shall be replaced by the Contractor at no additional cost to the Owner.

Item 1570.2 - Remote Controlled Changeable Message Signs

METHOD OF MEASUREMENT:

Measurement for Payment for Remote Controlled Changeable Message Signs (CMSs) shall be based on the number of weeks each changeable message sign is provided, moved, removed and maintained, complete, as required by the Owner or Engineer. CMSs which are on site but not requested or approved by the Owner or Engineer shall be at the Contractor's expense, i.e. CMSs which are brought on site earlier than directed, not removed in a timely manner when required, or which are not operational.

BASIS OF PAYMENT:
Payment for Remote Controlled Changeable Message Signs (CMSs) will be based on the unit price bid for this item in the proposal. Under the Unit Price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to provide, program, move, remove and maintain changeable message signs in approved locations within or adjacent to the project area, complete, as required by the Owner or Engineer. The work further includes, but is not limited to the following; coordinating with the Owner and Engineer for changeable message sign locations; furnishing and setting-up changeable message signs, power supply, programming equipment and appurtenances; maintaining message signs throughout project; relocating message signs to new locations as required by the Owner and Engineer; transportation and handling; and all incidental work required to furnish, place, program, maintain, relocate, and remove the CMSs. Additionally, for the "Remote Controlled Changeable Message Sign," the cellular telephone service and telephone charges shall be included.

Item 1570.3 – Safety Signing for Construction Operations

METHOD OF MEASUREMENT:
Measurement for payment for Safety Signing for Construction Operations shall be based on the Contractors Lump Sum bid calculated by dividing the elapsed time to date by the original Contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Safety Signing for Construction Operations shall be based on the lump sum price bid for this item in the proposal. Under the lump sum price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to fabricate, furnish, install, secure, maintain, relocate and remove Safety Signing for Construction Operations as required for the management of traffic and pedestrians and as further directed by the Owner, City and Engineer. The work includes, but is not limited to; fabrication of the signs; furnishing and installing signage; mounting and securing signage; maintaining signage; protecting and storing signage not in use; relocating signage; removal of signage; and all incidental work required to fabricate, furnish, install, maintain, relocate, and remove the Safety Signing for Construction Operations

SPECIAL NOTES ON EXCLUSIONS:
The following items are not included for payment under this item; "No Parking" signs; signs not specified or requested or approved by the Owner or Engineer, installed for the convenience of the Contractor; and signs not fabricated by a professional shop specializing in the fabrication of Signage for Construction Operations, i.e. hand painted or fabricated. Signage damaged as a result of misuse or improper handling shall be replaced by the Contractor at no additional cost to the Owner.

END OF SECTION 01570

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SECTION 01600

PRODUCTS, MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish and install products, equipment and materials as specified and indicated in accordance with the Contract Documents.

B. Provide transportation, handling, storage, and protection of all products, materials and equipment in accordance with the Contract Documents.

1.2 DEFINITIONS

A. The word "Products," as used herein, is defined to include purchased items for incorporation into the Work, regardless of whether specifically purchased for the project or taken from Contractor's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the Work.

C. Spare Parts are defined as subassemblies or components of the Products installed in the Work.

1.3 QUALITY ASSURANCE

A. Source Limitations: To the greatest extent possible for each unit of work, the Contractor shall provide products, materials, and equipment of a singular generic kind from a single source.

B. Compatibility of Options: Where more than one choice is available as options for Contractor's selection of a product, material, or equipment, the Contractor shall select an option which is compatible with other products, materials, or

equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.4 PRODUCT DELIVERY AND STORAGE

A. The Contractor shall deliver and store products, materials, and equipment for the Work in accordance with manufacturer's written recommendations and by methods and means that will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of materials, products, and equipment at site and overcrowding of construction spaces. In particular, the Contractor shall ensure coordination to ensure minimum holding or storage times for flammable, hazardous, easily damaged, or sensitive products, materials, and equipment to deterioration, theft, and other sources of loss.

1.5 TRANSPORTATION AND HANDLING

A. Products, materials and equipment shall be transported by methods to avoid damage and shall be delivered in undamaged condition in manufacturer's unopened containers and packaging.

B. The Contractor shall provide equipment and personnel to handle products, materials, and equipment by methods to prevent soiling and damage.

C. The Contractor shall provide additional protection during handling to prevent marring and otherwise damaging products, materials, equipment, packaging, and surrounding surfaces.

1.6 STORAGE AND PROTECTION

A. Products, materials and equipment shall be stored in accordance with manufacturer's written instructions and with seals and labels intact and legible. Sensitive products, materials and equipment shall be stored in weather-tight climate controlled enclosures and temperature and humidity ranges shall be maintained within tolerances required by manufacturer's recommendations.

B. For exterior storage of fabricated products, materials and equipment, the products, materials and equipment shall be placed on sloped supports above ground. Products, materials and equipment subject to deterioration shall be covered with impervious sheet covering and ventilation shall be provided to avoid condensation.

C. Loose granular materials shall be stored on solid flat surfaces in a well-drained area and shall be prevented from mixing with foreign matter.

D. Storage shall be arranged to provide access for maintenance and inspection. The Contractor shall periodically inspect to assure products, materials and equipment are undamaged and are maintained under required conditions.

E. Storage of materials and equipment in resource areas shall not be permitted.

F. Material or equipment is not permitted to be stored on private property within approval from the property owner.

G. No material or equipment to be stored within 25 feet of a street corner.

1.7 MAINTENANCE OF STORAGE

A. Stored products, materials and equipment shall be periodically inspected. The Contractor shall maintain a log of inspections and shall make the log available on request.

B. The Contractor shall comply with manufacturer's product, material and equipment storage requirements and recommendations.

C. The Contractor shall maintain manufacturer-required environmental conditions continually.

D. The Contractor shall ensure that surfaces of products, materials and equipment exposed to the elements are not adversely affected and that weathering of finishes and coatings does not occur.

E. Products, materials and equipment shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to acceptance by the Owner in accordance with the Contract Documents.

F. Contractor to keep materials free of debris, trash and water.

PART 2 - PRODUCTS

2.1 GENERAL

A. Do not use materials and equipment removed from existing premises, except as specifically required by the Contract Documents.

B. Where similar Products (such as grease fittings, flexible couplings, etc.) are used on different pieces of equipment or in different areas within the Work, standardize the Products by providing all Products from the same Supplier as specified by the Engineer.

2.2 GENERAL MATERIAL AND EQUIPMENT REQUIREMENTS:

A. The following requirements shall constitute the acceptable minimum standards for the equipment specified herein. Should these requirements conflict with the Supplier's recommendations or in any way be less stringent

than the Supplier's requirements, they shall be superseded by the Supplier's requirements.

B. Sleeves:

1. Provided sleeves shall be of ample diameter to pass the pipe and its insulation, if any, and to permit expansion.

2. Provide sleeves that are flush at the walls and at the bottom of slabs. Sleeves must project one inch above the finished floor surface. Threaded nipples shall not be used as sleeves.

C. Protection against Electrolysis:

1. Where dissimilar metals are used in conjunction with each other, provide insulation between adjoining surfaces to eliminate direct contact and any resultant electrolysis. Provide bituminous insulation, heavy bituminous coatings, nonmetallic separators or washers, impregnated felt, or similar arrangement.

PART 3 - EXECUTION

3.1 GENERAL MATERIAL AND EQUIPMENT INSTALLATION REQUIREMENTS

A. The following requirements shall constitute the acceptable minimum standards for installing the equipment specified herein. Should these requirements conflict with the Supplier's recommendations or in any way be less stringent than the Supplier's requirements, they shall be superseded by the Supplier's requirements.

B. Sleeves and Openings

1. Provide all chases or openings for the installation of the Work, or cut the same in existing Work.

2. Provide all sleeves or forms at the Work, and set them as indicated and as specified, and in ample time to prevent delays.

3. Locate all chases, openings, and sleeves as specified and indicated. If the location is not specified or indicated, locate all openings to avoid interference with equipment and piping.

4. If openings and/or sleeves were not provided prior to concrete placements, the Contractor shall provide and set them afterwards at no additional cost to the Owner. Confine the cutting to the smallest extent possible. In no case shall piers or structural members be cut without the written consent of the Owner.

5. Fit around, close up, repair, patch, and point around the work specified herein to the requirements of the Owner.

6. Perform all of this work by workmen using small hand tools. Do not use power tools except where, in the opinion of the Owner, the type of tool proposed can be used without damage to any work or structures and without interference with the operation of any facilities. The Owner's concurrence with the type of tools shall not in any way relieve or diminish the responsibility of the Contractor for such damage, or interference resulting from the use of such tools.

7. Do not cut or alter the work of any subcontractor or any other contractor, nor permit any subcontractor to cut or alter the work of any other contractor or subcontractor, except with the written consent of the contractor or subcontractor whose work is to be cut or altered, and with the written consent of the Owner. All cutting and patching or repairing made necessary by the Contractor or any subcontractors shall be done at no additional cost to the Owner.

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01600

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SECTION 01630

RESTORATION OF GROUNDS AND CLEANING UP

PART 1 - GENERAL

1.1 REQUIREMENTS

A. The Contractor on or before the completion of the work, except as otherwise expressly required or permitted in writing by the Owner, shall tear down and remove and legally dispose of all temporary structures built or used by him; shall remove all rubbish and debris of all kinds from all Contract structures and from any grounds which he shall have occupied within the limits of the project site; shall leave the site of the work in a satisfactorily neat and clean condition; shall remove from the land all abandoned materials and plant; and shall leave the spoil areas and the property which may have been affected by his operations in a neat and satisfactory condition. Also included is the restoration of all private grounds, including lawns, landscaped areas, driveway aprons and walkways damaged or disturbed in connection with the new work not elsewhere specified. Unless otherwise specified, all materials salvaged and not required to be reused shall be the property of the Contractor, and shall be legally disposed of off the site of the work.

B. Included in the work under this Section is the restoration, including replacement of damaged and disturbed shrubs and trees, retaining walls, of all grounds and grassed and landscaped areas removed or disturbed or damaged during the construction of the new work, including pipe laterals within private property areas, and storage and field office areas.

C. Also included in the work under this Section is the furnishing of all labor, materials, and equipment required to remove, store, and reset or replace bumper posts, stone walls of all types, flagstone, brick, concrete, asphalt walks, fences of all types, railings, signs and sign posts, signal posts, mailboxes and such other miscellaneous objects damaged or disturbed during construction.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01630

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SECTION 01701

PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes the requirements for project closeout including final clean up, closeout timetable, Owner's manual submittal, final submittals, maintenance and guarantee, and bonds.

1.2 FINAL CLEANUP

A. The Contractor shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction according to Specification Section 01630 – Restoration of Grounds and Cleaning Up. Final acceptance of the Work by the Owner will be withheld until the Contractor has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

B. The Contractor shall cleanup and restore all areas affected by staging, trailer(s) placement and parking. Restoration includes regrading, re-establishing topsoil and reseeding.

1.3 CLOSEOUT TIMETABLE

A. The Contractor shall establish dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established as specified elsewhere in the Contract Documents.

1.4 OPERATION AND MAINTENANCE

A. The Contractor's attention is directed to the condition that one percent (1%) of the applicable bid item price will be deducted from any monies due the Contractor as progress payments, if at the 75 percent construction completion point, the final O & M manuals complying with Section 01300 and the individual technical specification sections have not been submitted. The aforementioned amount will be retained by the Owner as the agreed, estimated value of the approved O & M manuals. Any such retention of money for failure to submit the approved O & M manuals on or before the 75 percent construction completion point shall be in addition to the retention of any payments due to the Contractor.

1.5 FINAL SUBMITTALS

A. The Contractor, prior to requesting final payment, shall obtain and submit the following items to the Engineer for transmittal to the Owner:

1. Written guarantees, where required.

2. Maintenance stock items; spare parts; special tools.

3. CCTV video and report of sewers and drains within Project Area.

4. O&M manuals of equipment as specified in Contract Documents.

5. Completed as-built / record drawings as described in Section 01200 GENERAL REQUIREMENTS FOR UTILITY WORK.

6. Certificates of inspection and acceptance by local governing agencies having jurisdiction.

7. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.6 MAINTENANCE AND GUARANTEE

A. The Contractor shall comply with the guarantee and warranty requirements contained in the General Conditions.

B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the Contractor shall have obtained a statement in writing from the affected private owner or public agency releasing the Owner from further responsibility in connection with such repair or resurfacing.

C. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Contractor fails to make such repairs or replacements promptly, the Owner reserves the right to do the Work and the Contractor and his surety shall be liable to the Owner for the cost thereof.

1.7 BOND

A. The Contractor shall provide a bond to guarantee performance of the provisions contained in Paragraph "Maintenance and Guarantee" above, and of the General Conditions.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 01701

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SECTION 02010

SUBSURFACE INVESTIGATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section includes the basic requirements and expectations of the Contractor in all work pertaining to subsurface conditions.

1.2 GENERAL REQUIREMENTS

A. 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 groundwater table or similar physical conditions at the site; the characterization and conformation of subsurface materials to be encountered; and all other matters that 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.

1.3 SUBSURFACE DATA

A. The findings of recent subsurface investigations are provided in the boring log information (included in the Appendix to these Specifications and as shown on the Drawings) and the analytical results of samples collected for waste characterization analyses are provided in the Appendix.

B. Such data is offered in good faith solely for the purpose of placing the Contractor in receipt of information available. The Contractor shall interpret such data according to his own judgment, and acknowledges that he is not relying upon the same as accurately describing the actual subsurface conditions or quantities of materials that may be encountered. The Contractor further acknowledges that he assumes all risk contingent upon the nature of the subsurface conditions to be actually encountered in performing the work covered by the Contract, even though such actual conditions may result in the Contractor performing more or less work than originally anticipated. In the event that quantities of waste soil/fill and related work as established in this Contract vary significantly from estimates provided, the unit bid prices will be the basis for compensation.

C. Re-use of excavated soils on- or off-site is subject to local, state and federal regulations and as specified in Section 02080 – SOIL AND WASTE MANAGEMENT and 02095 – TRANSPORTATION AND DISPOSAL OF SOIL AND FILL.

D. Additional subsurface investigation as may be warranted to satisfy a disposal facility's data requirements shall be the responsibility of the Contractor. Subsurface investigation activities shall not commence until a written work plan detailing the Contractor's approach for obtaining the data is approved by the Owner's Licensed Site Professional. The work plan must indicate the location and frequency of sampling; sampling parameters and sampling methodology. The Contractor shall allow a minimum of 14 days for review and comment.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – COMPENSATION (Not Used)

END OF SECTION 02010

SECTION 02015

GEOTECHNICAL MONITORING AND INSTRUMENTATION

2015.1	**VIBRATION MONITORING**	**LUMP SUM**
2015.2	**BUILDING MONITORING POINTS**	**EACH**
2015.3	**GROUND SURFACE AND UTILITY MONITORING POINTS**	**EACH**

PART 1 – GENERAL

1.1 SUMMARY

A. Work in this Section shall include, but not be limited to, all materials, equipment, labor, and services required to install, protect, replace, monitor and report on geotechnical instrumentation specified herein.

B. The work included in this section includes the following:

1. Vibration monitoring shall be performed continuously during all excavation, backfill and compaction, and installation of temporary earth support. Two seismographs shall monitor vibrations at two separate locations per a crew; one adjacent to the work and one adjacent to the nearest private property. Vibration levels shall not exceed the criteria indicated herein.

2. Furnish, install, protect, replace, monitor and report on wall monitoring points on the top of the temporary excavation support walls, a minimum of one every 20 feet, to measure horizontal displacements of these points during the Work. Locations of the monitoring points shall be distributed uniformly around the excavation support wall at locations proposed by the Contractor and accepted by the Engineer.

3. Furnish, install, protect, replace, monitor and report on ground surface monitoring points (GMPs), building deformation monitoring points (BMPs), and utility monitoring points (UMPs).

4. At locations where BMPs are noted, the Contractor shall conduct an exterior and interior inspection of the building. Pre-Construction Surveys shall be conducted in accordance with Section 01390.

5. At locations where structure and/or monitoring points are required on private property, the Contractor shall obtain a right of entry to obtain access. A Right of Entry form shall be obtained from the property

owner prior to conducting an internal building inspection.

6. The Contractor shall retain the services of Geotechnical Monitoring Consultant and Surveyor to install, monitor, maintain and report on geotechnical instrumentation that includes but is not limited to temporary excavation support wall monitoring points, GMPs, BMPs, UMPs, crack gauges, and vibrations. Monitoring frequency shall be daily during installation of the support of excavation, and thereafter shall be daily for all instruments located within 25 feet of the excavation, and two times per week for all instruments located within 100 feet from the edge of the excavation, during all excavation, backfill and compaction, unless otherwise directed by the Engineer or specified

7. Replace instrumentation damaged or made inaccessible by the construction operations at no additional cost to the Owner.

1.2 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS.

1. Qualifications of Surveyor and Geotechnical Monitoring Consultant. The Surveyor and Geotechnical Monitoring Consultant shall be approved by the Engineer and must be approved two weeks prior to mobilization for construction.
2. Shop drawings that indicate the instrumentation locations, sizes, material types, manufacturers' data and specifications, installation procedures, and other data. Provide description of work and materials
3. Contractor submittals shall be acceptable to the Engineer at least two weeks prior to undertaking the work. The Contractor shall forward submittals in advance considering that re-submittals may be required.

B. A mitigation plan shall be submitted to the Engineer by the Contractor a minimum of one week prior to any excavation and prior to the installation of the excavation support system. The mitigation plan shall detail the Contractor's course of action in the event threshold or limiting response values are met or exceeded. Such mitigation plan shall be revised as appropriate for each instance threshold and/or limiting values are reached.

C. The Surveyor shall submit initial baseline survey data on a plan indicating locations and elevations of all instrumentation monitoring points to the Engineer at least three days prior to beginning of the installation of the excavation support and excavation operations.

D. The Surveyor shall submit subsequent survey data on all instrumentation monitoring points to the Engineer prior to the beginning of work the following day. A faster turnaround of data reporting may be required by the

Engineer if threshold or limiting response values, as specified in this Section, are approached or exceeded. Data shall be tabulated and depicted graphically on plots and show incremental and cumulative movement since the start of excavation.

1.3 QUALITY CONTROL

A. The Contractor shall provide sufficient notice to the Engineer to allow the Engineer to be present to observe the Work. Cooperate with the Engineer in all respects to facilitate any testing or observations.

B. The Contractor may conduct additional testing or monitoring for its own information, at no additional cost to the Owner.

C. The presence of the Engineer (including observations and review of test results) shall not relieve the Contractor of its sole responsibility to perform the work in accordance with the Contract Documents, nor shall they be construed to relieve the Contractor from full responsibility for the means and methods of construction and for safety on the construction site.

D. Work not in conformance with the specified requirements shall be improved, or removed and replaced, at no additional cost to the Owner. All costs related to testing of nonconforming Work or materials shall be paid for by the Contractor, at no additional cost to the Owner.

E. Measure and report all data on movements of all instrumentation monitoring points to the nearest 0.01 ft.

F. Retain the services of Geotechnical Monitoring Consultant to monitor the geotechnical instrumentation, which includes and is not limited to crack gauges and vibration monitors. The consultant shall be a Geotechnical Engineer registered in the Commonwealth of Massachusetts and shall have demonstrated at least five years' experience and at least three projects of similar type, size, and complexity including installation and monitoring of surface settlement and vibrations with seismographs. The Geotechnical Monitoring Consultant shall adhere to all methods and standards described in this Specification.

G. Retain the services of a Surveyor to monitor the deformation monitoring points, which includes and is not limited to building, ground surface, utility, and excavation support system monitoring points. The Contractor's Surveyor shall be registered in the Commonwealth of Massachusetts and shall have demonstrated at least 5 years experience and at least three (3) projects of similar type, size, and complexity including installation and monitoring of surface vertical and horizontal displacement points. The Contractor's

Surveyor shall be approved by the Engineer and must be approved two weeks prior to construction. The Contractor's Surveyor shall adhere to all methods and standards described in this Specification.

PART 2 – PRODUCTS

2.1 BUILDING AND GROUND SURFACE DEFORMATION MONITORING POINTS

A. Building monitoring points (BMPs) shall consist of a #4 rebar 12 inches long driven flush into the ground surface or ¼-inch diameter stainless steel socket head cap screw drilled 2 inches into the building surface and extending approximately 1.5 inches from the building face as shown on the Contract Drawings. Ground surface monitoring points (GMPs) shall consist of 3-inch long surveyors' "PK" nails securely nailed in place as shown on the Contract Drawings. GMPs may also consist of an observable point punch marked on the top horizontal surface of a manhole or catch basin rim. The steel surface within 3 inches of the point shall be cleaned by wire brush to permit easy identification of the exact point. The point shall be clearly identified using fluorescent spray paint adjacent to the point.

2.2 TEMPORARY EXCAVATION SUPPORT WALL MONITORING POINTS

A. Temporary excavation support wall monitoring points shall consist of an observable point punch marked on the top horizontal surface of the piles or sheeting. The surface within three inches of the point shall be cleaned by wire brush to permit easy identification of the exact point. The point shall be clearly identified using fluorescent spray paint adjacent to the point.

2.3 VIBRATION MONITORING

A. Provide portable seismographs for monitoring the velocities of ground vibrations resulting from construction activities. Provide either:

1. Model Blastmate II or Blastmate III as manufactured by Instantel, Inc., Kanata (Ottawa), Ontario, Canada;

2. Model SU 200ODK as manufactured by P.R. Berger & Associates, Warrandale, PA;

3. Model VMS-500 as manufactured by Thomas Instruments, Inc., Spofford, NH;

4. Model NC5310/D, as manufactured by Nomis Inc., Birmingham, AL;

5. Or equal.

B. The seismograph shall have the following minimum features:

1. Seismic range: 0.01 to 10 inches per second with an accuracy of 5 percent and no more than a 3 db roll off at the low frequency end.

2. Flat frequency response: 2 to 200 Hertz.

3. Three component sensor.

4. Fourth channel for air blast monitoring

5. Two power sources: Internal rechargeable battery and charter and 115 volts AC. Battery must be capable of supplying power to monitor vibrations continuously for up to 24 hours.

6. Capable of internal dynamic calibration.

7. Direct writing to printer and to electronic memory than can be downloaded or saved to an external memory device. Instruments provided shall be capable of producing strip chart recordings of readings on site within one hour of obtaining the readings. Provide computer software to perform frequency analyses of data obtained on magnetic disks.

8. Continuous monitoring mode must be capable of recording peak velocities.

C. A factory calibration shall be conducted on all seismographs at the manufacturer's facility prior to shipment. Each factory calibration shall include a calibration curve with data points clearly indicated, and a tabulation of the data. Each instrument shall be marked with a unique identification number.

2.4 UTILITY MONITORING POINTS

A. Utility Monitoring Points (UMPs) will be used to monitor vertical deformation of the existing utilities at the locations shown on the plans.

B. Provide 2-inch PVC casing, threaded and coupled, as-needed.

C. Provide No. 4 rebar, threaded and coupled, as-needed.

D. Provide centralizers spaced at 3 feet maximum

E. Installation borehole shall be backfilled with cement-bentonite grout.

F. Provide a 6 inch (I.D.) cast iron road box cover.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

A. Do not install any instruments until the Owner and the Engineer have been notified.

B. Construction activity shall not commence until instrumentation installed within the vicinity of the work are set up.

3.2 INSTALLATION

A. Building or Monitoring Points (BMPs)

1. BMPs shall be installed at the locations shown on the plans.

2. All BMPs shall have the horizontal as-built location determined to an accuracy 0.5-feet and the elevation to an accuracy of 0.01-feet.

B. Utility Monitoring Points (UMPs)

1. UMPs shall be installed at the locations shown on the plans.

2. Where necessary, the Contractor shall install the UMPs by the use of vacuum excavation exercising due diligence not to disturb or damage the utility being monitored and to minimize disruption and damage to adjacent areas.

3. The location of the utility in plan shall be determined and the excavation advanced to within a maximum of 2-feet above the utility. The Contractor shall be responsible for any damage to the utility during installation of the utility monitoring points.

4. After completion of installation, the as-built location in horizontal position shall be determined to an accuracy of 0.5-foot and in elevation to an accuracy of 0.01-feet.

C. Ground Surface Monitoring Points (GMPs)

1. GMPs shall be installed at the locations shown on the plans.

2. All GMPs shall have the horizontal as-built location determined to an accuracy 0.5-feet and the elevation to an accuracy of 0.01-feet.

D. Seismographs

1. A seismograph shall be installed each day for each crew performing earthwork operations. The seismographs shall be installed adjacent to existing structures within 25 feet of the work. If there are no existing structures within 25 feet, the seismograph shall be installed on a firm

surface 25 feet from the work zone.

2. Vibration sensors shall be firmly mounted on the surface of concrete or asphalt, or firmly set in undisturbed soil.

3. The daily reports shall clearly describe the location of the seismograph relative to the work zone and the work performed in the vicinity on that date.

E. Crack Gauges

1. Locations of existing building cracks shall be identified during the Pre-Construction Condition Survey.

F. Formal Initial Readings

1. Obtain formal initial readings (FIRs) on all installed instruments for use as the baseline reference for the instrument. Before establishing the FIR for each instrument, a minimum of three readings shall be performed that demonstrate that changes resulting from the installation process have ceased. The three readings demonstrating that the installation has stabilized shall be performed on different days and may be used to establish the FIR.

2. Obtain the first initial baseline readings on BMPs, SMPs, UMPs, and crack gauges no later than seven days prior to the start of installation of the temporary excavation support or excavation operations.

3. The FIR for a BMP, GMP, or UMP will consist of the average of two survey measurements of elevation or horizontal offset with two independent set-ups. Where applicable, the initial readings shall be taken after allowing sufficient time for the grout or epoxy to set. Each reading other than the FIR shall consist of a single set of survey measurements. Reference all elevation readings to a deep benchmark. Reading accuracy shall be +/-0.01 foot. Report elevations to the nearest 0.001 foot.

4. The FIR for a crack monitor will be the reading of the cross hairs on the crack monitor when the tape connecting the two plates is cut after the monitor has been installed and/or the epoxy has set. Reading accuracy shall be +/-0.5 mm.

5. The FIR (background reading) for a seismograph shall be performed prior to any vibration-producing construction activities to document background vibrations, and also at the start of vibration-producing construction activities to establish the maximum energy which can be used without surpassing acceptable vibration and overpressure levels at nearby facilities. The Contractor shall notify the Authority at least

24 hours prior to starting a new vibration-producing construction task. Monitoring during pile driving, pavement breaking, demolition, excavation, and other vibration-producing construction activity shall consist of recording single-component peak particle velocities, which shall be printed on a strip chart. Continuous monitoring and full waveform data shall be recorded and submitted. During all monitoring of vibration-producing construction activities the Contractor shall document all events that are responsible for the measured vibration levels, and submit the documentation to the Authority with the data.

3.3 MONITORING

A. Monitoring Frequency

1. Vibration Monitoring

a. Vibration monitoring shall be performed continuously during all excavation, backfill, and compaction and installation of temporary earth support.

2. Building, and Ground Surface Monitoring Points

a. Monitoring frequency shall be at a minimum daily during excavation for monitoring points located within 25 feet from the edge of the excavation and two times per week thereafter for monitoring points located within 100 feet from the edge of the excavation during all excavation, backfill and compaction, unless otherwise directed by the Engineer or specified.

3. Temporary Excavation Support Wall Monitoring Points

a. Monitoring frequency shall be at a minimum daily during all excavation, construction, backfill, and compaction unless otherwise directed by the Engineer or specified and two times per week thereafter until the support of excavation system is removed.

b. Immediately following installation of each element of the lateral support system, the Surveyor shall establish a baseline parallel to each side of the excavation from which offset (horizontal displacement) measurements shall be made to the pile.

c. Offset (horizontal position) monitoring of the temporary lateral earth support systems shall be made at least twice per week until the excavation is backfilled to within 2-ft of final grade,

or as directed by the Engineer. A minimum accuracy of 0.01 ft. shall be maintained.

4. Crack Gauges

   a. Monitoring frequency shall be at a minimum daily during excavation in within 25 feet from the edge of the excavation during all excavation, backfill and compaction, unless otherwise directed by the Engineer or specified.

   b. Monitoring frequency shall be at a minimum two times per week for crack gauges located within 25 to 100 feet from the edge of the excavation during all excavation, backfill and compaction, unless otherwise directed by the Engineer or specified.

5. Monitoring frequency may be increased as required by the Engineer for some or all of the monitoring points if the threshold or limiting response values are approached or exceeded during the Work, at no additional cost to the Owner.

B. After each set of readings is obtained, the data shall be sent to the Engineer within 24 hours, where the data will be reviewed and interpreted. The Contractor shall make its own interpretations for the data. The Contractor shall monitor and interpret data from additional instrumentation that it deems necessary to ensure the safety of its work. The Engineer is not responsible for the safety of the work based on its review of the instrumentation data.

C. Reporting Data:

1. A plan showing location and numbering system for monitoring points shall be submitted to the Engineer prior to start of temporary excavation support installation and excavation operations, along with results of two initial baseline surveys. Monitoring frequency shall be on a daily basis during installation of the excavation support system and once per week thereafter for all instruments located within 100 feet from the edge of the excavation unless otherwise required by the Engineer.

2. Tables of results of surveys shall be submitted prior to the beginning of work the following day. The table of survey results shall include the initial measurement, the current measurement, and the amount of movement since start of excavation.

3. Survey data shall be depicted graphically on plots and submitted with

the tabular results to show incremental and cumulative movement since the start of excavation.

D. Criteria for “threshold” and “limiting” response values have been established as provided in the following table:

Instrument	**Monitoring**	**“Threshold” Value**	**“Limiting” value**
BMP	Vertical or horizontal movement	0.25 inches	0.5 inches
	Angular distortion between adjacent points	1/1000	1/750
GMP	Vertical movement	0.25 inches	0.5 inches
UMP	Vertical or horizontal movement	0.25 inches	0.5 inches
Seismograph	Vibrations in peak particle velocity	0.3 inches per second at frequencies of 60 Hz or less	0.5 inches per second at frequencies of 60 Hz or less

E. The Contractor shall immediately notify the Engineer and shall take immediate steps to control further movement by revising construction procedures, providing supplemental bracing or other measures (working extended hours as approved or temporarily terminating work in the area of movement if necessary) as required if any of the following occur:

1. Field measurements indicate that any of the "threshold" movement criteria are reached or exceeded.

2. Field measurements or observations indicate that significant or sustained wall movements, beyond those reasonably expected, are occurring (total movement may be less than the "Limiting" movement criteria).

1. Movements of adjacent structures, utilities or other facilities are detected.

F. If "Limiting" movements are being approached or reached, the Owner may require the Contractor to temporarily suspend the work in the area where such movement is occurring and implement all necessary mitigation measures which are satisfactory to the Engineer, to arrest the movements, at no cost to the Owner.

G. Installation of Work in the area where the Limiting Values had been reached shall not be permitted until the results of optical surveys indicate no increase

in lateral movement of the earth support system and adjacent surface and building settlement for the one-week period immediately prior to resuming construction.

H. These criteria are intended to establish a minimum basis for the Contractor's design and procedures and do not relieve the Contractor of its responsibility for preventing detrimental movements and damage to adjacent structures, utilities or other work.

I. The Contractor shall pay a penalty $1,000 for each day the Contractor works in violation of any threshold or limiting values being reached or exceeded as determined by the Engineer.

J. In the event the Contractor does not comply with the approved mitigation plan, or continues to work in violation of threshold or limiting values being reached or exceeded, the Contractor shall not be allowed to continue work until proper mitigation procedures and corrections have been made as required by the Owner and Engineer.

K. The Contractor shall be responsible for repairing all property damage caused by construction activities.

3.4 PROTECTION OF INSTRUMENTATION

A. Protect all instruments during the course of the Work. Any damage or loss of function caused by the Contractors operations, or by any other cause, to new or existing instrumentation devices, shall be immediately repaired or the equipment replaced at no additional cost to the Owner.

PART 4 – COMPENSATION

Item 2015.1 - Vibration Monitoring

METHOD OF MEASUREMENT:
Measurement for payment for Vibration Monitoring will be on a percent of the Lump Sum bid calculated by dividing the elapsed time to date by the contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT/ INCLUSIONS:
Under the Unit Price for Vibration Monitoring, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to perform all vibration monitoring as specified in the Contract Specifications and also as required by the Engineer. Payment under this Item includes, but is not limited to; furnishing, installation and maintenance of seismographs; monitoring seismograph data and submission of all data to the Engineer; submission of shop drawings and submittals as required.

Item 2015.2 – Building Monitoring Points

METHOD OF MEASUREMENT:
Measurement for payment for Building or Structure Monitoring points will be based on the per Each bid as approved by the Engineer.

BASIS OF PAYMENT/ INCLUSIONS:
Under the Unit Price for Building or Structure Monitoring Points, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to furnish, install, replace, monitor, and report on all structure monitoring points as specified in the Contract Specifications and also as required by the Engineer. Payment under this Item includes, but is not limited to; acquisition of rights of entry, furnishing, installation, maintenance, and monitoring for structure monitoring points; furnishing, installation, and maintenance of all crack gauges; monitoring of all crack gauges and submission of all data to the Engineer; conduct site visits with the Geotechnical Engineer to locate building or structure monitoring points of shop drawings and submittals as required.

Item 2015.3 – Ground Surface and Utility Monitoring Points

METHOD OF MEASUREMENT:
Measurement for payment for Ground and Utility Monitoring points will be based on the per Each bid as approved by the Engineer.

BASIS OF PAYMENT/ INCLUSIONS:
Under the Unit Price for Surface and Utility Monitoring Points, the Contractor shall furnish all labor, materials, instrumentation, tools, equipment, and incidentals required to furnish, install, replace, monitor, and report on all surface and utility monitoring points as specified in the Contract Specifications and also as required by the Engineer. Payment under this Item includes, but is not limited to; furnishing, installation, and maintenance of all crack gauges; monitoring of all crack gauges and submission of all data to the Engineer; furnishing, installation, maintenance, and monitoring for ground and utility monitoring points and temporary support excavation monitoring points; conduct site visits with the Geotechnical Engineer to locate Surface and utility monitoring points; submission of all data to the Engineer; submission of shop drawings and submittals as required.

END OF SECTION 02015

SECTION 02051

DEMOLITION, MODIFICATION, AND ABANDONMENT

2051.1	**DISPOSAL OF CONSTRUCTION DEBRIS AS SOLID WASTE**	**TON**
2051.2	**DISPOSAL OF BITUMINOUS CONCRETE**	**TON**
2051.3	**DEMOLITION OR REMOVAL OF LAMP HOLE, MANHOLE, CATCH BASIN OR OTHER STRUCTURE**	**EACH**
2051.4	**ABANDON PIPE IN PLACE**	**LF**
2051.5	**DEMOLITION OR REMOVAL OF PIPE**	**LF**

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 the following significant items; all other activity shown on the Drawings; and work necessary and defined herein pertaining to the project area: removal of pavement; removal of existing manholes; removal of existing pipe; and selective demolition.

1.2 RELATED DOCUMENTS

A. Section 02080 – SOIL AND WASTE MANAGEMENT

B. Section 02095 – TRANSPORTATION AND DISPOSAL OF SOIL AND FILL

C. Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING

D. Section 02590 – BRICK MASONRY

E. Section 03315 – GROUT

F. Section 02160 – TEMPORARY EXCAVATION SUPPORT SYSTEMS

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Removal and abandonment procedures that shall provide for safe conduct of the Work, careful removal and disposition of materials and equipment, protection of utilities, structures, property, or other features which are to remain undisturbed and coordination with existing utilities or owners responsible for those nearby elements to remain in service.

2. A detailed work plan to include a list of items to be removed and/or abandoned, a sequence and schedule, and a list of salvageable materials and equipment.

3. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

4. Schedule of Selective Demolition, Modification and Abandonment Activities subject to approval by the Owner and Engineer. Indicate the following:

    a. Detailed sequence of selective demolition, modification and abandonment work, with starting and ending dates for each activity. Ensure the Owner’s operations are uninterrupted.

    b. Interruption of utility services.

    c. Coordination for shutoff, capping, bulkheading and continuation of utility services.

    d. Proposed materials, construction details, locations of temporary utilities, abandonment materials, and means of access.

    e. Coordination of Owner's continuing use of portions of utilities, structures, property or other features and of Owner's partial occupancy of completed Work.

5. Additional Submittals for Selective Demolition, Modification, and Abandonment Activities

a. Inventory: After selective demolition or modifications are complete, submit a list of items that have been removed and salvaged.

b. Pre-demolition Photographs or Videotape: Show existing conditions of adjoining utility construction and site improvements that might be misconstrued as damage caused by selective demolition or modification operations. Submit before Work begins.

c. Landfill Records: Indicate receipt and acceptance of all wastes by disposal facility licensed to accept the wastes to be disposed.

6. Masonry Plugs and Bulkheads

a. For each permanent and temporary bulkhead and masonry plug, the Contractor, at a minimum, shall submit the following, prepared by a Massachusetts Registered Professional Civil or Structural Engineer:

i. Design Loads

ii. Restraining Mechanisms

iii. Method of Installation

iv. Results of Field Inspection after Installation

v. Decommissioning Method

b. If temporary pneumatic or hydro plugs are proposed, in addition, the Contractor shall submit the method and procedure of maintaining bladder pressure.

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 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 damages to existing facilities, which are caused by the operations. Damages to such work shall be repaired or replaced to its existing condition at no additional cost to the Owner. The Contractor shall carefully coordinate the work of this Section with all other work and shall provide shoring, bracing, and supports, as required. The Contractor shall insure that structural elements are not overloaded or compromised and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this Contract. The Contractor shall remove all temporary protection when the work is complete.

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 selective demolition area. Conduct selective demolition, modification and abandonment so Owner's operations will not be disrupted. Provide not less than 24 hours notice to Owner of activities that will affect Owner's operations.

C. Owner assumes no responsibility for condition of the utilities, structures, properties or other facilities to be selectively demolished.

D. If materials suspected of containing hazardous or asbestos materials are encountered, do not disturb; immediately notify Engineer.

E. Storage or sale of removed items or materials on-site will not be permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition, modification and abandonment operations.

1.7 QUALITY ASSURANCE

A. Comply with Section 01400 - QUALITY CONTROL

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Pre-Demolition, Modification, and Abandonment Conference: Conduct conference at Project site, which includes Owner and Engineer. Review methods and procedures related to selective demolition.

D. Review and finalize selective demolition, modification and abandonment schedule and verify availability of materials, labor, equipment, and facilities needed to make progress and avoid delays.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Comply with material and installation requirements specified in individual Specification Sections.

2.2 MATERIALS OWNERSHIP

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 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.

2.3 REPAIR MATERIALS

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 repair materials whose installed performance equals 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.

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: 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.

3.2 PREPARATION FOR WORK

A. Verify that utilities have been disconnected and capped, shut-off, or bulk headed. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition, modification and abandonment required. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

C. Engage a professional engineer to survey condition of structures to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

D. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

E. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition, modification, and abandonment operations.

3.3 SITE ACCESS, TEMPORARY FACILITIES AND PROTECTION

A. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used utilities, structures, properties or facilities.

B. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

C. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

D. Protect existing site improvements, appurtenances, and landscaping to remain.

E. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

F. Temporary Facilities: Provide temporary barricades and other protection required for demolition security and to prevent injury to people and damage to adjacent utilities, structures, properties and facilities to remain.

G. Provide protection to ensure safe passage of people around the area.

H. Temporary Shoring: Provide and maintain in accordance with Section 02160 - TEMPORARY EXCAVATION SUPPORT SYSTEMS.

I. Strengthen or add new supports when required during progress of selective demolition.

J. Existing landscaping materials, structures, pipes and appurtenances, which are not to be removed/abandoned shall be protected and maintained as required by the Engineer and as specified.

3.4 POLLUTION CONTROL

A. Water sprinkling, temporary enclosures, and other suitable methods shall be used to limit dust and dirt rising and scattering in the area. Comply

with government regulations pertaining to environmental protection. Water shall not be used when it creates hazardous or objectionable conditions such as ice, flooding, or pollution.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3.5 CLEANING

A. During and upon completion of work, the Contractor shall promptly remove unused tools and equipment, surplus materials, rubbish, debris, and dust and shall leave areas affected by work in a clean, approved condition.

B. All areas shall be cleaned of dust, dirt, and debris caused by demolition, modification, or abandonment and adjacent areas returned to conditions existing prior to start of work.

3.6 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition, modification and abandonment operations.

B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

C. Provide at least 72 hours notice to Owner if shutdown of service is required during changeover.

D. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished or abandoned.

E. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition, relocation or abandonment, and that maintain continuity of service to other parts of building.

3.7 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 and objectionable material prior to commencing demolition, modification, or abandonment.

C. 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 piping, to include catch basin laterals, 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. Abandoned pipe smaller than 15 inches diameter shall be capped or plugged at both ends prior to backfill. Abandoned pipe 15 inches diameter and larger shall be filled with Controlled Density Fill (CDF) prior to being capped, plugged, or bulk headed and backfilling unless otherwise noted. Each pipe reach to be abandoned with CDF shall be filled with CDF from the up gradient end of the pipe reach wherever possible. The CDF shall completely fill each pipe reach and flow out the other end. The Contractor can aid the flow of the CDF in the pipe by providing a temporary structure at the access point to build up head or by pumping the CDF or by providing vibration in the pipe reach or access point. Requirements for Controlled Density Fill are described in Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

D. Where existing drainage structures such as catch basins, drain manholes, sewer manholes, and combined sewer manholes are to be abandoned in place, the Contractor shall remove the frames, grates, and covers and cut the structures down a minimum of 2 feet below final grade. The Contractor shall put a minimum of four, 2-inch diameter drainage holes in the invert of each structure and then backfill the structure with control density fill or compacted sand as specified and as approved by the Engineer. Backfill around the structure shall be in accordance with Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

E. Permanent plugs shall be constructed of Class B concrete, brick or other material approved by the engineer.

F. Fill excavations with solid fill resulting from earth removal operations and/or with select borrow material in accordance with Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING. 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.

3.8 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings, joints and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

3. Maintain adequate ventilation when using cutting torches.

4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

5. Dispose of demolished items and materials promptly.

6. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

7. Existing Facilities: Comply with Owner's requirements for using and protecting utilities, structures, properties and other facilities.

B. Removed and Salvaged Items: Comply with the following:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items: Comply with the following:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.

2. Pack or crate items after cleaning and repairing. Identify contents of containers.

3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition, cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.9 REHABILITATION/MODIFICATION PROCEDURES

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, catch basins 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.

D. At locations where existing piles are to be reused to replace the existing sewer or drain, the Contractor shall verify that the wood pile is not deteriorating. If wood piles scheduled for reuse are found to be in good condition, the piles shall be trimmed and capped with a concrete pile cad as indicated in the Contract Drawings. If wood piles scheduled to remain in place are found to be deteriorating, the Contractor shall notify the Engineer immediately.

3.10 DISPOSAL OF REMOVED/DEMOLISHED MATERIALS

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 included in the appropriate Bid Items and at no additional cost to the Owner.

B. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. Demolition material shall be reused as fill to the extent possible. Removal of demolition debris, not utilized as fill, 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.

C. Burning: Do not burn demolished materials.

D. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.11 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.

B. Promptly repair damage to adjacent construction caused by selective demolition operations.

C. Patching: Comply with Section 01045 - CUTTING AND PATCHING.

D. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

E. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

3.12 MASONRY PLUGS AND BULKHEADS

A. Shall be designed by a Massachusetts Registered Professional Civil or Structural Engineer and shall be installed by a qualified mason having experience in the construction of temporary and permanent masonry plugs and bulkheads of the same general nature of those Specified and proposed.

PART 4 – COMPENSATION

Item 2051.1 - Disposal of Construction Debris as Solid Waste

METHOD OF MEASUREMENT:
Measurement for payment for Disposal of Construction Debris as Solid Waste shall be on the basis of Tons of waste actually disposed, as measured at the disposal facility by certified scale, and documented on the return manifest or certified weight slip. Solid Waste disposed of for which return manifests or certified weight slips have not been submitted will not be paid for.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Disposal of Construction Debris as Solid Waste shall be based on the per ton price bid for this item in the proposal. Under the per ton price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to Dispose of Construction Debris as Solid Waste. The work includes, but is not limited to; handle, load, transport, stockpile, weigh and dispose at an appropriately permitted facility; all cobbles, rail, timber, brick, cement concrete, metals, granite curb, edging, inlets and corners, plastic, or other construction debris; and all fees, permits, taxes, sampling, testing and analysis required by the facility.

SPECIAL NOTES ON EXCLUSIONS:
The excavation and removal of the items listed above for disposal are not included herein but are included for payment elsewhere. This is a disposal item only. Soils are not included for payment herein but are included for payment in the appropriate soil disposal item. Soil weight excavated and disposed with Construction Debris due to poor segregation techniques shall be estimated by the Engineer and deducted from the total weight disposed. Disposal of bituminous concrete is not paid for herein but is included for payment elsewhere. Bituminous Concrete weight excavated and disposed with Construction Debris due to poor segregation techniques shall be estimated by the Engineer and deducted from the total weight disposed. Payment for the disposal of

abandoned or relocated existing gas, telephone, electric, cable TV, telecommunications, fire alarm and traffic signal utilities shall NOT be paid herein or separately elsewhere and are considered "incidental" to the Contract, with costs to be carried in the Contractor's base bid. Disposal of concrete and brick sidewalks, driveways, and handicap ramps removed and disposed of is not included herein but is carried under the unit price for the construction of the new sidewalks, driveways and handicap ramps.

Item 2051.2 - Disposal of Bituminous Concrete

METHOD OF MEASUREMENT:
Measurement for payment for Disposal of Bituminous Concrete shall be on the basis of Tons of bituminous concrete actually disposed, as measured at the disposal facility by certified scale, and documented on the return manifest or certified weight slip. Bituminous Concrete disposed of for which return manifests or certified weight slips have not been submitted will not be paid for.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Disposal of Bituminous Concrete shall be based on the per ton price bid for this item in the proposal. Under the per ton price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to Dispose of Bituminous Concrete. The work includes, but is not limited to; handle, load, transport, stockpile, weigh and dispose at an appropriately permitted facility all bituminous concrete; and all fees, permits, taxes, sampling, testing and analysis required by the facility.

SPECIAL NOTES ON EXCLUSIONS:
The excavation and removal of bituminous concrete is not included herein. The excavation of bituminous concrete is considered incidental to the contract and is not included for separate payment unless otherwise specified. This is a disposal item only. Soils are not included for payment herein but are included for payment in the appropriate soil disposal item. Soil weight excavated and disposed with Bituminous Concrete Pavement due to poor segregation techniques shall be estimated by the Engineer and deducted from the total weight disposed. Disposal of construction debris as solid waste is not included for payment herein but is included for payment elsewhere.

Item 2051.3 - Demolition or Removal of Lamp Hole, Manhole, Catch Basin or Other Structure

METHOD OF MEASUREMENT:
Measurement for payment for Demolition or Removal of Lamp Hole, Manhole, Catch Basin or Other Structure shall be on the basis of the number of individual lamp holes, manholes, catch basins or other structures demolished or removed complete as measured by the Engineer. Manholes, catch basins or other structures that are partially demolished or removed for the Contractor's convenience, or not fully removed or demolished where indicated in the Contract Documents, will be at the Contractor's expense and at no

additional cost to the Owner.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Demolition and/or Removal of Lamp Hole, Manholes, Catch Basins or Other Structures shall be based on the number of individual lamp holes, manholes, catch basins or other structures demolished or removed complete for this item in the proposal. Under the per each price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for Demolition or Removal of Lamp Hole, Manhole, Catch Basin or Other Structure. The work includes, but is not limited to: saw cutting existing bituminous and cement concrete; excavation; furnishing and placing backfill per one of the approved methods; furnish and install filter fabric as required; compaction and compaction testing; temporary excavation support furnished and installed complete; construction dewatering; disconnecting existing pipe, services and other connections; removal or demolition of the manhole, catch basin or other structure; masonry plugs in the disconnected pipe not specified for payment elsewhere; remove and stack or remove and dispose existing castings as required; salvage of materials specified; stockpile of salvaged materials and delivery of materials identified as to be salvaged to a location designated by the Owner.

SPECIAL NOTES ON EXCLUSIONS:
The following items are not included for payment under this item but are included for separate payment elsewhere; disposal of construction debris as solid waste; demolition and removal of pipes; abandonment of manholes, catch basins or other structures.

The demolition of existing, abandoned or relocated gas, electric, telephone, cable TV, fire alarm, traffic signal, or telecommunications structures and utilities are not included for payment herein or elsewhere but are considered incidental to the Contract and the Contractor shall carry costs in the base bid as necessary.

Item 2051.4 - Abandon Pipe in Place

METHOD OF MEASUREMENT:
Measurement for payment for Abandon Pipe in Place shall be based on the per linear feet of individual pipesabandoned in place as measured by the Engineer as measured from beginning of abandonment to end of abandonment.

BASIS OF PAYMENT / INCLUSIONS:
Payment Abandon Pipe in Place shall be based on the linear feet of abandoned pipe as indicated in the Contract Documents or as required by the Engineer. Under the per unit price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to abandon the existing sewers, drains, or water mains. The work includes, but is not limited to; saw cutting; excavation; furnish and placing backfill per one of the approved methods; furnish and install filter fabric as required; compaction and compaction testing; temporary excavation support furnished and installed complete; furnish and installation of masonry plugs or caps; construction dewatering; disconnecting existing pipe, services and other connections; identification and verification of all

unknown active connections through surface inspection, CCTV inspection, dye testing, test pit, or other method approved by the Engineer for transfer to an active and functioning pipe; furnishing and installing control density fill; and incidental work not indicated for payment elsewhere.

SPECIAL NOTES ON EXCLUSIONS:
The following items are not included for payment under this item but are included for separate payment elsewhere; disposal of construction debris as solid waste; and demolition and removal of lamp holes, manholes, catch basins or other structures; removal, demolition, or abandonment of pipe less than 15-inches in diameter. Abandonment of pipe less than 15-inch diameter is incidental work.

The demolition of existing, abandoned or relocated gas, electric, telephone, cable TV, fire alarm, traffic signal, or telecommunications structures and utilities are not included for payment herein or elsewhere but are considered incidental to the Contract and the Contractor shall carry costs in the base bid as necessary.

Item 2051.5 – Demolition or Removal of Pipe

METHOD OF MEASUREMENT:
Measurement for payment for Demolition or Removal of shall be based on per linear feet of individual pipes, 15-inch through 24-inch diameter, demolished or removed complete as measured by the Engineer as measured from inside wall of structure or beginning of demolition to inside wall of structure or end of demolition. Pipe demolished or removed for the Contractor's convenience, not indicated to be removed or demolished in the Contract, will be at the Contractor's expense and at no additional cost to the Owner.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Demolition or Removal of Pipe shall be based on the linear feet of existing pipe requiring removal as indicated in the Contract Documents or as required by the Engineer. Under the per unit price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to Demolish or Remove Pipe. The work includes, but is not limited to; saw cutting; excavation; furnish and placing backfill per one of the approved methods; furnish and install filter fabric as required; compaction and compaction testing; temporary excavation support furnished and installed complete; furnish and installation of masonry plugs or caps; coordination with MWRA for removal of abandoned water main; construction dewatering; disconnecting existing pipe, services and other connections; identification and verification of all unknown active connections through surface inspection, CCTV inspection, dye testing, test pit, or other method approved by the Engineer for transfer to an active and functioning pipe; demolition and removal of the pipe; salvage of materials specified; stockpile of salvaged materials and delivery of materials identified as to be salvaged to a location designated by the Owner; and incidental work not indicated for payment elsewhere.

SPECIAL NOTES ON EXCLUSIONS:

The following items are not included for payment under this item but are included for separate payment elsewhere; disposal of construction debris as solid waste; and demolition and removal of lamp holes, manholes, catch basins or other structures.

The demolition of existing, abandoned or relocated gas, electric, telephone, cable TV, fire alarm, traffic signal, or telecommunications structures and utilities are not included for payment herein or elsewhere but are considered incidental to the Contract and the Contractor shall carry costs in the base bid as necessary.

END OF SECTION 02051

SECTION 02080

SOIL AND WASTE MANAGEMENT

2080.1 OHM - SOIL AND WASTE MANAGEMENT LUMP SUM

PART 1 – GENERAL

1.1 QUALIFICATIONS

A. The Contractor shall be experienced and knowledgeable and have the trained and qualified personnel needed to conduct the work as specified herein

1.2 RELATED DOCUMENTS

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

B. The following documents are available for review at the office of the Owner, 1 Franey Road, Somerville, MA 02145, and appended to the technical specifications in Appendices

1. "Medford/Pearl Sewer Environmental Conditions", dated January 15, 2016.

1.3 OBJECTIVE and OVERVIEW

A. This Section includes furnishing all plant, labor, equipment, appliances, and materials, and performing all operations in connection with the handling, treating, stockpiling, transporting, and disposal and/or reuse of soil and associated fill and waste material resulting from the construction operations as specified.

B. This Section also includes requirements for handling spills of contaminated and/or hazardous materials.

C. The objective of soil management practices is to handle all soil and fill excavated during this contract in accordance with applicable state, federal and local regulations and bylaws and to implement off-site soil management in a cost-effective manner. The Contractor shall reuse excavated soils on-site to the maximum extent possible and minimize the volume of material to be disposed off-site.

D. This Section includes protocol for handling and management of waste materials, including, but not limited to, construction debris, municipal waste, boulders, soil, fill, ash, rubble, and empty or crushed drums and/or drum

parts. The Contractor shall provide the services of an Environmental Professional qualified to coordinate all soil/fill-handling activities with the Owner or Engineer and/or their representative.

E. In the course of the work, it may be necessary to excavate and handle potentially contaminated soil/fill. The soil/fill management practices specified herein apply to all soil/fill excavated during the course of this contract. To the extent possible, the Contractor shall reuse geotechnically suitable excavated material prior to using imported backfill to reduce the volume of material to be disposed off-site. Imported backfill shall be used only as accepted by the Engineer.

F. Excavation and management of project soils and groundwater shall be conducted in accordance with:

1. A release-specific Utility-related Release Abatement Measure (URAM) Plan to be prepared by the Owner's Licensed Site Professional (LSP) and submitted to MassDEP by the City of Somerville DPW in the event that an unanticipated release is encountered; and

2. The Memorandum "Medford/Pearl Sewer Environmental Conditions", dated January 15, 2016 and attached to these specifications.

G. All work shall be conducted in compliance with the following Contractor-prepared plans, which may be combined as appropriate so long as all requirements of each Plan are incorporated and distinct:

1. Site-Specific Health and Safety Plan;
2. Soil Management Plan;
3. Equipment and Personnel Decontamination Plan;
4. Dust, Vapor and Odor Control Plan;
5. Air Monitoring and Quality Control Plan; and
6. Spill and Discharge Control Plan.

1.4 DEFINITIONS

A. Area of Contamination: For the purpose of managing soil which is RCRA hazardous waste, the area of contamination is the contiguous area within which the waste has been identified.

B. Area of Excavation: For the purposes of reusing soil/fill on-site, the *area of excavation* is considered to be the approximate area in which the soil/fill was removed provided that area is consistent in soil strata, color, texture, geotechnical properties and has substantially similar visual and olfactory characteristics as accepted by the Engineer. Soil/fill returned to the *area of excavation* shall be placed approximately in the same horizontal and vertical location from which it originated

C. Excavation: The removal of materials encountered to the elevation and width limits indicated in the Contract Drawings, Specifications, or as directed by the Engineer.

D. Fill (Historic Fill): Fill, also known as historic fill 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. Materials commonly associated with historic fill include, but are not limited to; coal, glass, brick, ash, wood fragments and other similar granular materials. Historic fill shall not include boulders, ledge, consolidated rock, asphalt pieces, concrete, railroad timbers, rail, cobblestones or other abandoned building materials that would preclude the disposal of the urban fill as daily cover at a landfill.

E. Hazardous Waste:

1. Defined in 310 CMR 40.0006; or

2. 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.

F. 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.

G. Sediment: All detrital and inorganic or organic matter situated on the bottom of lakes, ponds, streams, rivers, the ocean, or other surface water bodies.

H. Soil Classification Categories: Unless specifically stated otherwise terms used in this specification are as defined in the MCP, 310 CMR 40.0006. The following definitions and soil classifications apply to these specifications:

1. (Class A) Any soil or fill material which has concentrations of chemicals < RCS-1 Reportable Concentrations established by 310 CMR 40.0300 and 40.1600.

Class A soils may be reused at a the following types of facilities: Managed Fill Site (operating under an Administrative Consent Order (ACO) issued by MassDEP, unless otherwise approved by the owner); or a permitted landfill, provided that in all cases, the excavated soil analyte concentrations meet the acceptance criteria established by the facility and that disposal of soil at the receiving facility will not result in an exceedance of an RC applicable at the point of disposal and which would require notification of a release pursuant to 310 CMR 40.0300. Soils not exhibiting evidence of contamination or soils determined through laboratory chemical analysis to be Class A soils may also be reused in the area of excavation.

Soil/fill with OHM concentrations ≥ RCS-1, but which have been confirmed by the Owner's LSP to contain asphalt as a result of historic road construction or filling operations, and therefore exempt from notification requirements, may be categorized as Class A at the discretion of the Owner's LSP.

Class A soil may be reused as common fill/ordinary borrow provided it also meets the physical requirements as specified herein and as specified in Section 02210 - Earth Excavation, Backfill, Fill and Grading. Class A soil may be used in gravel processing facilities provided the soil analytical data is comparable to materials being used by the facility and such use is approved by the Engineer.

Class A soil /fill which is reused or disposed of off-site shall be transported under a Material Shipping Record (MSR). Management of Class A soils shall be conducted in conformance with the MassDEP Similar Soils Provision Guidance – WSC#-13-500 (2014).

2. (Class B) Contaminated: 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, regardless of whether it is exempt from notification.

Any soils exhibiting either petroleum or chemical odor or visual indications of oil or hazardous materials as accepted by the Engineer shall be handled as potentially contaminated soils. Potentially contaminated soils can be reused within the area of excavation without first performing laboratory analyses, with the approval of the Owner's LSP. Any excavated soil/fill material which is not reused within the area of excavation, must be characterized prior to reuse. 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. Surplus soil/fill which may be contaminated shall be segregated by the Contractor. Potentially contaminated soils shall not be mixed with soils not exhibiting either petroleum or chemical odor or visual indications of oil or hazardous materials. Soil/fill which has been staged and characterized can be reused within the area of excavation or

elsewhere on site provided the material has been characterized by laboratory analysis and has equal or less contamination than the point where it is to be reused.

3. Class B soil which cannot be reused on site shall be reused off-site, recycled, or disposed of at a permitted facility. Subcategories of Class B, which establish off-site management requirements, are defined as follows:

   a. Class B-1: Soil and Fill that meet all applicable criteria (i.e., Massachusetts Department of Environmental Protection (MassDEP) Policy # COMM 97-001 - Reuse and Disposal of Contaminated Soil at Massachusetts Landfills Policy, and/or facility-specific permit requirements) for 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 Class B-1.
   b. Class B-2: Soil and Fill that meet all applicable criteria (i.e., COMM 97-001 and/or facility-specific permit requirements) for reuse as daily cover, intermediate cover, or pre-cap contouring material at in-state lined landfills.
   c. Class B-3: Soil and Fill that meet all applicable criteria for recycling at an asphalt batching plant and/or the specific licensing requirements for the proposed recycling facility.
   d. Class B-4: Soil and Fill that contain concentrations of contaminants that exceed in-state, lined, and unlined landfill reuse criteria as well as asphalt batching acceptance criteria, but meet the criteria for regional thermal treatment facilities, and are not classified as a RCRA Hazardous Waste.
   e. Class B-5: Soil and Fill that contain concentrations of contaminants that exceed in-state, lined and unlined landfill reuse criteria or which require removal to regional disposal facilities and which is not classified as RCRA Hazardous Waste.
   f. Class B-6: Soil and fill which does not meet one of the designations above due to excessive foreign materials and/or debris and which is not classified as a hazardous waste.

4. (Class C) 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.

Soil having or suspected of having the characteristics of a hazardous waste or of containing a listed hazardous waste shall not be removed from the excavation or staged at another location except at the direction of the Engineer. Subcategories of Class C shall be as follows:

a. Class C-1: Soils classified as hazardous waste that can be treated on-site to eliminate the toxicity characteristic (e.g., for lead).

b. Class C-2: Material determined to contain "listed" or "characteristic" hazardous waste constituents which cannot be treated on-site. Land disposal of hazardous soil is prohibited until the soil has been treated to meet Land Disposal Restrictions (LDR) standards pursuant to 40 CFR 268.48. This material must be transported to an out-of-state approved RCRA permitted disposal or treatment facility under a Uniform Hazardous Waste Manifest. Land disposal following achievement of the Uniform Treatment Standards (UTS) shall be at a RCRA landfill.

I. Special Waste: means any solid 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 solid waste. Asbestos and PCB-contaminated soils/fill (at regulated concentrations) are examples of special waste categories.

J. Soil (Natural Soils): Soil, otherwise known as natural soil, is defined as unconsolidated sand, gravel, silt and clay, and the organic material which has become part of the unconsolidated soil matrix.

K. 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.

L. Unknown Materials: Any material, that is not readily identifiable as non-hazardous 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. Unlabeled 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 non-hazardous.

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 direct the Contractor as to the nature of the material being known or unknown.

1.5 WORK INCLUDED

A. Managing excavated soil and fill material, including disposal and/or reuse of excavated soil and fill material.

B. The Contractor's Environmental Professional shall characterize all excavated soil and fill material prior to off-site reuse or disposal. Characterization requirements may vary depending on the site selected to receive soil suitable for reuse or the disposal facility permits and policies. Precharacterization data collected by the Owner's LSP may be used; however, the Contractor is responsible for final waste characterization and shall determine if any additional waste characterization is required. The Owner shall not be responsible for any additional for soil characterization.

C. Characterization of soil, fill, and unknown material for disposal/reuse purposes, including; field screening and soil management/segregation; temporary storage/staging; and laboratory analysis (as may be necessary for unknown materials and/or for compliance with receiving facility requirements). Where additional analysis is required, metal analysis shall be for MCP 14 metals.

All laboratory chemical analyses conducted shall utilize currently accepted U.S. EPA and applicable state agency analytical protocols and procedures. Laboratory chemical analysis reports shall meet MassDEP Compendium of Analytical Methods (CAM) requirements for analysis which have published CAM requirements. The MassDEP MCP Analytical Method Protocol Certification Form shall be provided by the Laboratory with all sample results. TCLP analysis shall be conducted for any analyte for which the RCRA "rule of twenty" is exceeded.

D. Management of contaminated groundwater: If groundwater potentially impacted by OHM, based on visual or olfactory evidence, is encountered in the course of the work and dewatering is required, discharge permits, modification of discharge permits, and/or 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 Contactor if groundwater potentially impacted by OHM is identified.

E. All work at the site must be performed in accordance with all applicable federal, state, and local regulations, permits and licenses, including, but not limited to:

1. 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, Toxic Substances Control Act (TSCA), and the National Emission Standards for Hazardous Air Pollutants (NESHAPS) as regulated by the U.S. Environmental Protection Agency (U.S. EPA);

2. 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;

3. MassDEP Technical Update. Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil (2002)

4. Department of Transportation (DOT) regulations 49 CFR, and state transportation licenses and permits;

5. 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;

6. NIOSH/OSHA/USCG/EPA: “Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities” October 1985, DHHS (NIOSH). Publ. No. 85-115;

7. Department of Transportation training;

8. U.S. Army Corps of Engineers Section 404 Programmatic General Permit, Commonwealth of Massachusetts;

9. General Contractor's license;

10. National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) to discharge and associated Construction General Permits and Remediation General permits;

11. Regional and local Publicly Owned Treatment Works (POTW) pre-treatment and construction dewatering requirements and permits;

12. Excavation and/or grading permits;

13. Special use permits;

14. Special waste haulers certificate;

15. Massachusetts Wetlands Protection Act and associated Order of Conditions;

16. The Contractor's Soil Management Plan (SMP) and Health and Safety Plan to protect the workers and the public.

17. Massachusetts Division of Occupational Safety (DOS): The Removal, Containment or Encapsulation of Asbestos (453 CMR 6), including all clarifications, policy statements, etc.

18. Massachusetts Department of Environmental Protection:310 CMR 7.00, 7.09, 7.15 and all related amendments and policy statements, and

19. MassDEP: Asbestos Cement Pipe Guidance Document (2011)

20. Massachusetts Division of Occupational Safety (DOS): The Removal, Containment or Encapsulation of Asbestos (453 CMR 6), including all clarifications, policy statements, etc.

21. Massachusetts Department of Environmental Protection:310 CMR 7.00, 7.09, 7.15 and all related amendments and policy statements.

22. MassDEP Technical Update: Considerations for Managing Contaminated Soil: RCRA Land Disposal Restrictions and Contained-In Determinations, August 2010;

23. MassDEP Similar Soils Provision Guidance (2014)

E. Implementation of the submitted HASP and other applicable monitoring and control plans including 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.

F. The Contractor shall develop, implement, maintain, supervise, and be responsible for all soil management practices during the course of this contract. The Contractor's Environmental Professional shall be present during all 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.

Soil management activities shall include and be conducted as specified herein:

1. 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 at no additional cost to the Owner 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. Contractor shall provide means of separating potentially contaminated material from the staging area ground surface to prevent the potential of cross-contamination. Separation method to be provided in accordance with 3.4(C).

2. Excavated soil that cannot be re-used on site shall either be loaded directly into containers for off-site reuse or disposal (provided the material is consistent in visual, olfactory and chemical characteristics as observed in previous investigations) or be staged at a location determined and secured by the Contractor pending sampling and analytical characterization by the Contractor's Environmental Professional prior to characterization and off-site reuse or disposal, with the exception that soil suspected of having the characteristics of a hazardous waste or of containing a listed hazardous waste shall not be removed from the excavation or staged at another location except at the direction of the Engineer. Since individual disposal facilities 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.

3. The Contractor shall control and contain runoff of free liquids drained from stockpiled soil/fill. Free liquids shall be managed in accordance with applicable regulations.

4. Soil that has been chemically stabilized shall be confirmed through laboratory chemical analysis to be characteristically non-hazardous pursuant to RCRA prior to off-site shipment and disposal.

5. Soil/fill shall not be staged within 100 feet (30.5 meters) of a Reservoir, or Area of Critical Environmental Concern. Soil/fill shall not be staged in the work area over night.

6. Excavating unknown, previously uncharacterized material which may be classified as RCRA hazardous waste and disposing of it at an approved facility and/or on-site treatment of these materials to render it non-hazardous prior to and disposing of it at an approved facility.

7. Removing characterized on-site materials for off-site re-use or disposal.

8. Demobilizing the site, including, but not limited to, removing and disposing of 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 washwater storage tanks; disconnection of temporary utilities; and final clean-up to pre-construction conditions.

9. The Contractor shall manage unknown material separately and temporarily stage the material pending characterization.

G. All incidental, Contractor-generated waste (such as Personal Protective Equipment, decontamination wash water, etc.) resulting from the services hereunder are the property and responsibility of the Contractor and are to be disposed of by the Contractor under a Uniform Hazardous Waste Manifest and/or by a Massachusetts Bureau of Waste Site Cleanup Bill of Lading, as appropriate.

H. The Contractor is responsible for identifying potential hazards at the site and reviewing existing information.

1.6 RELATED WORK

A. Section 01025 – MEASUREMENT AND PAYMENT

B. Section 01108 – HEALTH AND SAFETY PROCURES

C. Section 01500 - TEMPORARY FACILITIES AND CONTROLS

D. Section 02010 - SUBSURFACE INVESTIGATION

E. Section 02095 - TRANSPORTATION AND DISPOSAL OF SOIL AND FILL

F. Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING

G. Section 02140 – DEWATERING

1.7 EXISTING CONDITIONS.

A. Limited chemical characterization of soil has been conducted, the results of which are presented in the report referenced in Paragraph 1.2 of this section. The Contractor is obligated to review existing environmental assessment reports and manage the soil and groundwater in accordance with applicable state and federal regulations.

B. Reports and files regarding the project area indicate the following:

1. Two gasoline service stations, each with one or more documented releases of petroleum, are located adjacent to the Project Area. While available reports indicate that petroleum concentrations in soil and groundwater decrease to below applicable regulatory standards by the property boundaries nearest the Project Area, petroleum impacted soil and/or groundwater may be encountered.

C. Site investigation results indicate the following:

1. One soil boring (B-1), finished as a monitoring well, was advanced in the Project Area near the Medford/Pearl Street intersection in 2015. One representative composite sample was collected and analyzed for disposal parameters. No analytes were detected above background concentrations. No visual or olfactory indication of contamination was noted. Groundwater was sampled using low flow methodology. The only analyte detected was barium, orders of magnitude below applicable standards.
2. Though no contamination was encountered in boring B-1, considerable heterogeneity is possible due to the variable nature of historic fill. Contamination may be encountered during Project Excavation.
3. Due to utility conflicts, no soil or groundwater was sampled in the Project Area near the Medford/School Street intersection.

1.8 SUBMITTALS

A. The Contractor shall prepare a Work Plan that generally describes the work to be performed under Section 02080 Part 3 (Execution). The work plan shall include, but not be limited to detailing the submittal and implementation of the following:

1. Site-Specific Health and Safety;
2. Soil Management;
3. Dust, Vapor, and Odor Control;
4. Air Monitoring and Quality Control; and

5. Spill and Discharge Control.

The Work Plan shall be submitted to the Owner and Engineer for review and acceptance at least two weeks prior to beginning any intrusive work at the site.

B. The Contractor shall provide the qualifications of the Environmental Professional(s) to be assigned to this project. The Environmental Professional(s) shall be at a minimum certified, registered or licensed as an Environmental Professional or equivalent and hold a Bachelor of Science Degree in Environmental Science, Environmental Engineering, or Public Health or related degree and have sufficient experience in similar work to perform the responsibilities detailed herein. The Environmental Professional(s) shall have demonstrated experience in management of RCRA hazardous waste soils and groundwater.

C. Soil Management: The Contractor shall prepare a Soil Management plan that outlines measures for soil and fill sampling, field screening, laboratory chemical analysis, treatment, and disposal/reuse. At a minimum, this plan shall address the following:

1. Methods, procedures, and equipment used for treating, excavating, dewatering, characterizing, segregating, reusing/backfilling, loading, and transportation of contaminated soil/fill materials encountered during excavation operations, including Class A, B, and C soils;

2. A list of all transporters and waste facilities, complete with license numbers, permit or ACO numbers (as applicable), contact person, and address and telephone number that the Contractor utilizes for waste disposal. The Contractor shall provide copies of the permits/ACOs held by each disposal facility which the Contractor plans to use to dispose of non-hazardous solid waste; and if necessary, to dispose of hazardous waste (due to lead toxicity), PCB-impacted waste and/or asbestos-containing waste;

3. A summary of the history of compliance actions for each disposal/recycling 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. Procedures for securing the staging area, controlling dust and soil/fill migration, prevention of contamination of excavated soil by trucks used for asphalt, separation of stockpiled materials from staging area ground surface, preventing damage to uncontaminated areas via contaminant migration and for decontaminating vehicles and personnel exiting the staging area;

5. The means and methods for decontaminating all equipment and personnel, including provisions for installing an equipment decontamination pad if required or specified;

6. Methods and procedures for identifying stockpiled material (e.g., labeling, marking containers) and procedures for identification and tracking;

7. 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;

8. Methods, procedures, and equipment proposed for assessing and handling Unknown Materials. The SMP 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 SMP, 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 will contact in such an event.

9. Provisions for separation of incompatible materials;

10. Protocol for over-packing drums (if encountered);

11. Procedures for consolidating (i.e., bulking) compatible materials for disposal; and

12. Procedures for dewatering; testing, handling, treatment, and disposal/discharge of groundwater.

D. 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/fill to be delivered and agrees that the soil/fill 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), as applicable, Uniform Hazardous Waste Manifests and/or Bills of Lading for all soils and associated fill disposed or reused of off-site utilizing such documents. Copies of all manifests, Bills of Lading, and all other documents used to track and/or permit off-site transportation of soils shall be submitted to the Engineer within ten (10) days of shipment. The Contractor is responsible for preparation of all manifests, Bills of Lading, Material Shipping Records, and all other related documents completely, legibly, and accurately prior to submitting them to the Owner and/or its representative for generator and LSP signatures. (Bills of Lading shall be prepared electronically by the Owner's LSP; the Contractor shall be responsible for providing information necessary for completion of the BOL). The Contractor shall be responsible for paying for any and all fines associated with inaccurate, incorrect, or improperly completed manifests, Bills of Lading and all other related documents, including fines resulting from late or untimely submittals.

E. Spill and Discharge Control (SDC): The SDC program shall provide contingency measures and reporting responsibilities for potential uncontrolled spills and discharges of contaminated and/or hazardous materials, including, but not limited to, leachate, decontamination water, sewage, and other on-site waste materials. In addition to the above listed items, the SDC program 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 include:

    a. Owner's designated representatives;
    b. Owner;
    c. Fire Department;

d. Engineer; and
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.

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 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.

F. Dust, Vapor and Odor Control (DVOC): The DVOC program shall include measures to control objectionable dust, vapors, and chemical or natural odors originating from the work area or soil/fill staging area. The DVOC Plan shall describe procedures to minimize the creation of dust, and the control of objectionable vapors and odors originating from the site. At a minimum, the DVOC program shall include air monitoring as specified in paragraph 3.6. The Contractor shall have materials on hand to implement control measures.

PART 2 – PRODUCTS

2.1 DUST AND VAPOR CONTROL

A. Air monitoring shall include total dust testing using MIE, Inc. Miniram PDM-3 Dust Monitors, or like instruments. Air monitoring shall include monitoring total volatile organic vapors using a MiniRAE Photoionization Detector or like instrument.

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 EQUIPMENT DECONTAMINATION PAD

A. The Contractor shall provide all materials and labor to complete an equipment decontamination pad if required or specified. Liner materials and collection system shall be selected by the Contractor to perform as specified.

PART 3 – EXECUTION

3.1 GENERAL

A. All work in this section will be performed in accordance with the Contractor's Work Plan, SMP and Site-Specific HASP.

B. The primary concern of the Contractor in the excavating, handling, sampling, bulking, and on-site storage of soil/fill 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. 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.

3.2 SOIL/FILL MANAGEMENT

A. Soil and fill material that is managed under a Utility-related Abatement Measure (URAM) Plan pursuant to the MCP, which is staged off-site, and which is not characteristically hazardous, 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.

B. Soil and fill material that is managed under a Utility-related Abatement Measure (URAM) Plan pursuant to the MCP, which is staged off-site and which is determined at the staging area to be characteristically hazardous for

lead may be treated (stabilized) within the "Area of Contamination" (AOC) only and must be reused or disposed of within ninety (90) calendar days of excavation. No treatment may occur at the staging area if outside the "Area of Contamination".

C. Class B and C excavated soils shall be completely covered with a minimum 10-mil thick layer of plastic tarp. 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. Stockpiled soils determined to be Class B or C, 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, including those of Class A soils, shall also be covered at times as directed by the Engineer.

D. Excavated soil shall be managed such that it is not exposed to contamination following excavation. Equipment and supplies in contact with excavated soil shall be free of asphalt, petroleum products or other hazardous materials that could be transferred to soil. Vehicles used to transport asphalt shall not be used to transport soil except by permission of and following inspection by of the truck, by the Engineer.

3.3 SOIL/FILL CHARACTERIZATION

A. Soil and fill material shall be classified based on the criteria established in the accepted SMP and these Specifications.

B. Initial Characterization of Soil/Fill Material: A summary of existing conditions and investigation findings performed by the Engineer during design, including a summary of analytical results, is appended to this section.

C. It is the Contractor's responsibility to determine if the data appended to this section is sufficient to pre-characterize soil/fill for disposal. If additional data is required, the Contractor may either perform independent sampling and pre-characterization of soil/fill strata to be encountered during construction in advance of excavation such that excavated soil can be 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 pending analyses.

D. Soil shall be preliminarily segregated based on the Soil Classification Categories detailed in Sub-section 1.4, except as indicated below.

1. Potential Asbestos Containing Material (PACM): If soil/fill suspected of including asbestos-containing debris is encountered during excavation, the Contractor or the Contractor-hired Environmental Professional 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 notified and approval for handling and disposal obtained. Discovery and management of PACM shall be documented as required in the SMP. Evidence of PACM includes but is not limited to the presence of suspect asbestos-containing building debris such as broken or crushed asbestos-cement (transite) piping, vinyl floor tiling, tar-based pipe wrap, roofing paper or paper-like insulation materials. Following MassDEP approval, such soil/fill shall be managed in accordance with applicable regulations. Soils shall be analyzed for OHM to determine appropriate disposal requirements, as required by the proposed disposal facility.

2. Unknown Material. If unknown material is encountered during excavation, the Contractor or the Contractor-hired Environmental Professional shall immediately contact the Engineer 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, bulging (evidence of reactive waste), crushed, or empty. Crushed, empty, and/or skeletal parts of drums shall be handled as solid waste, as specified. 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 SMP.

E. Disposal Characterization: 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 disposal and to adequately estimate the disposal costs. The Contractor shall perform additional segregation based on disposal requirements. Disposal or reuse of the material shall depend on sampling and characterization analytical results. The Contractor shall, at the direction of the Engineer, provide a split sample to the Engineer. The Contractor shall provide notice to the Engineer of when sampling will occur 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 cost of imported fill material used in its place.

3.4 STAGING AREAS

A. Unless the staging area is comprised of an impervious surface material such as asphalt or concrete, the Contractor shall pre-characterize the surface soils (0-6") at the staging area(s) prior to staging any soils to document the existing

conditions relative to contamination which may result from using the area to stage excess or unknown materials. A minimum of one composite surface soil sample, consisting of at least five grab samples, for every 2,500 square feet of staging area shall be collected by the Contractor prior to staging materials at the location. The samples will be submitted to a certified laboratory for analysis for:

1. MCP 14 total metals;
2. Volatile organic compounds (EPA Method 8260B);
3. Semi-volatile organic compounds (EPA Method 8270);
4. Total petroleum hydrocarbons (EPA Method 8100M or equivalent); and
5. Polychlorinated biphenyls (PCBs) (EPA Method 8082).

B. At the completion of the work, the Contractor shall replicate the pre-staging sampling and analysis protocol to assess impacts to the area from use as a staging area.

C. Stockpiles located within the soil staging areas shall be placed on asphalt or concrete, or on a 20-mil HDPE liner and bermed to minimize the effects of contamination release. Each soil category shall be staged in separate areas with berms constructed a minimum of 2 feet above the existing grade with common fill, hay bales, concrete barriers, or functionally equivalent berm material. Waste characterized as RCRA hazardous waste shall not be stored on site for a period greater than sixty (60) days. All other waste must be disposed off-site within ninety (90) days of excavation.

D. As described above and herein, excavated materials shall be completely covered with a minimum 10-mil thickness polyethylene tarp and secured with tires, ropes, anchors or equivalent material. The covered 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 recovered should wind forces expose any of the excavated materials. Stockpiles shall also be covered at times as directed by the Engineer.

E. Stockpiles are to be segregated based on a review of pre-characterization data and visual and olfactory conditions and field screening results obtained during excavation. Stockpiles shall be segregated by source location as approved by Engineer. Each stockpile must be clearly separated from adjacent stockpiles.

F. Stockpiles shall be limited in size to approximately 500 cubic yards, unless approved by the Engineer. If, as a result of combining soil piles into larger volumes than 500 cubic yards, soil must be disposed of as a higher cost bid item than would otherwise be required, the Contractor shall be responsible for the additional cost.

G. Stockpiles shall be clearly designated by a sign post or marker which can be cross-referenced with the source location and 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. Excavated soil shall not be added to a stockpile after it has been sampled for characterization.

I. Unknown, potentially hazardous soils/debris and drummed materials encountered during the project shall be located in a separate bermed location. The Contractor's Soil 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 acceptance 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.

3.5 EQUIPMENT AND PERSONNEL DECONTAMINATION

A. Equipment and personnel decontamination area(s), conforming with the Contractor's HASP and these Specifications, shall be constructed in such a manner to protect existing site surfaces, materials, and structures from contamination. Equipment decontamination areas shall be sized adequately to provide for the decontamination of the largest piece of equipment to be decontaminated. Filter fabric shall 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 or sample compositing 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.

3.6 ENVIRONMENTAL FIELD MONITORING/DUST CONTROL

A. The Contractor's Site Health and Safety Officer shall keep accurate documentation of all air monitoring in accordance with the Contractor's Health and Safety Plan. Air monitoring data shall be made available to the Engineer or Owner upon request. At the direction of the Engineer, air monitoring may be limited to visual assessment for dust and odor monitoring; instrument monitoring may be required at any time by the Engineer, based on the results of visual and odor monitoring.

B. During excavation and construction at depths of greater than 2 feet below ground surface, the Contractor shall monitor the air quality at and surrounding the areas where construction activities involve soil handling such as excavation, re-location, staging, loading or grading of soil/waste materials. Air monitoring shall involve appropriate techniques, capable of providing real-time indications of air contaminants to protect on-site personnel and the local population. If there are indications of contamination, the frequency of air monitoring shall be determined by the Contractor's Industrial Hygienist or competent environmental health professional. The Contractor's Site Health and Safety Officer and Superintendent shall be responsible for assuring that monitoring is conducted in an appropriate manner by personnel trained to operate the air monitoring equipment, record measurements, and compare to action limits established by the Contractor's Health and Safety Plan, and that work practices, engineering controls and/or Personal Protective Equipment are proper for the conditions.

C. The air monitoring program is to be designed to protect public health and the environment from the potential generation of dust and odors and contaminant release during work. 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 prior to commencement of site activities.

D. Air monitoring shall be performed by the Contractor during all soil handling operations. In contaminated areas, detectors for organic contaminants and dust should be utilized to monitor on-site and off-site breathing zones and possible sources of potentially hazardous material (e.g. excavations, regrading, etc.). All personnel shall be made aware of the potential hazards and be informed of air monitoring information by the Contractor. Particular attention to air quality shall be made in the work area during earthwork activities to ensure that contaminants do not escape to the atmosphere and affect off-site population, on-site control, working conditions and personnel protection measures.

E. Dust shall be controlled during excavation of soil/fill material to limit potential spread of contaminants and potential exposure of contaminants to workers and the public.

F. Ambient dust levels at the site shall be monitored by the Contractor prior to construction. During construction, real-time dust monitoring shall be conducted during any soil/fill handling activities. 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, 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.

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.

Access roads shall be sprayed with water on a regular basis to minimize the generation of dust.

H. 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.

I. In the event that asbestos containing materials are encountered, dust control measures, which may include negative air containment, shall be instituted in accordance with all applicable local, state and federal laws and regulations.

J. Air monitoring shall include screening for methane, %Lower Explosive Limit, hydrogen sulfide, oxygen and total volatile organic compounds.

3.7 VAPOR AND ODOR CONTROL

A. The Contractor shall provide the materials and labor to control objectionable vapors and odor in accordance with the Contractor's Vapor and Odor Control Plan. 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.

3.8 BULKING

A. Following characterization and compatibility testing of waste material, the Contractor shall place compatible materials into common containers to reduce transport and disposal costs. 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 Fill Management Plan.

3.9 BACKFILLING AND COMPACTION

A. Excavated areas shall be backfilled with appropriate backfill material (including excavated material suitable for reuse and, when necessary, imported off-site material). Imported backfill used in excavated areas shall have been analyzed and certified as free of contaminants and as specified in Section 02210 – EARTH EXCAVATION, BACKFILL, FILL, AND GRADING.

PART 4 – COMPENSATION

Item 2080.1 – OHM - Soil and Waste Management

METHOD OF MEASUREMENT:
Measurement for Payment shall be based on the following breakdown; a maximum of 3 percent of the lump sum will be paid upon the finished construction of the completed soil/fill staging area as specified and accepted by the Engineer. A maximum of 4 percent of the lump sum will be paid upon the submittal and acceptance of all related submittals, plans and shop drawings. A minimum of 3 percent of the lump sum will be paid at the complete removal and restoration of the staging area, as approved by the Engineer. The balance of the Lump Sum measurement for payment for will be on a percent of the Lump Sum bid remaining,

calculated by dividing the elapsed time to date by the contractual construction time limit as approved by the Engineer. Deducts for work not performed as specified shall be applied.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Soil and Waste Management shall be based on the lump sum price complete for this item in the proposal. The Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for Soil and Waste Management. The work includes, but is not limited to; Environmental Professional; dewatering Professional; soil/fill sampling; analytical services; development and implementation of all submittals and plans specified including, but not limited to: Health and Safety Plan; Equipment and Personnel Decontamination Plan; Soil and Waste Management Plan; Dust, Vapor, and Odor Plan; Air Quality Control Plan; and a Spill and Discharge Control Plan; submittal of all required certifications; coordination with all parties affected and maintaining proper documentation necessary; disposal of wastes, such as construction-related waste and by-products, and Contractor-generated waste material, such as personal protective equipment, excess materials, debris, wash water, and any other waste materials not specifically addressed in other payment items; waste characterization sampling and analysis costs for the waste referenced above; construct and maintain a secure (enclosed with 8 foot high fencing and gate) soil/fill staging area for soil/fill stockpiling pending analytical testing, reuse, or disposal; all permits and administration fees; collecting and testing surface soil samples pre- and post- use of staging area; placement of polyethylene liner under piles; additional placement of bituminous or cement concrete as may be needed at the staging area; construction of segregated soil/fill bays; signage and lighting at the staging area; installation of sedimentation and erosion control at the staging area; construction of a truck wash down area; construction of a decontamination area with wheel wash; maintenance including placement of daily polyethylene covers over existing stockpiles; performing dust control; street sweeping; vehicle wheel-washing in the staging areas as needed to control airborne dust and sediment from spreading beyond the staging area or presenting a health risk to the workers or public; day to day security measures; maintenance of the soil/fill stockpiles to avoid migration; and maintenance of the sedimentation and erosion control measures; and removal, hauling, and disposal of all items of which the staging area was constructed as well as the restoration of the site to pre-construction conditions.

EXCLUSIONS:
The following items are not included for payment under this item; transportation and disposal of soil and fill material; re-use of soil and fill material on site as backfill; handling unknown materials; sedimentation and erosion control for other uses besides soil management (at the staging area); and all work associated with a staging area for other uses beyond soil and waste management.

END OF SECTION 02080

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SECTION 02095

TRANSPORTATION AND DISPOSAL OF SOIL AND FILL

2095.1	**OHM - DISPOSAL OF SOIL- LESS THAN RCS-1 (CLASS A)**	**TON**
2095.2	**OHM - DISPOSAL OF SOIL – DAILY COVER UNLINED LANDFILL (CLASS B-1)**	**TON**
2095.3	**OHM - DISPOSAL OF SOIL – DAILY COVER LINED LANDFILL (CLASS B-2)**	**TON**
2095.4	**OHM - DISPOSAL OF SOIL – NON-HAZARDOUS SOLID WASTE ASPHALT BATCHING (CLASS B-3)**	**TON**

PART 1 – GENERAL

1.1 DESCRIPTION

A. Furnish all labor, materials, equipment, and incidentals required to transport off site, and dispose, reuse or recycle excess soil (defined herein as including sediments and fill) at a licensed facility approved by the Owner.

B. All personnel involved in the transportation of waste from the site shall have the required Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) training.

1.2 RELATED WORK

A. Section 01108 – HEALTH AND SAFETY PROCEDURES

B. Section 01500 – TEMPORARY FACILITIES AND CONTROLS

C. Section 02010 – SUBSURFACE INVESTIGATION

D. Section 02051 – DEMOLITION, MODIFICATION, AND ABANDONMENT

E. Section 02080 – SOIL AND WASTE MANAGEMENT

F. Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. A list of all transporters, destination/receiving sites and waste facilities, complete with license numbers and permit numbers (as appropriate), contact person, and address and telephone number that the Contractor utilizes for soil management and waste disposal.

2. Where appropriate the Contractor shall submit waste manifests for all waste disposed off-site to the appropriate authority, agency, facility, or person within the time constraints specified by state and federal regulations. Copies of all waste manifests and Bill of Lading documentation including weight slips and BOL summary sheets shall be provided to the Owner within 10 days. It is the responsibility of the Contractor to complete all waste manifests and bills of lading completely and accurately prior to submitting them to the Owner. For MassDEP Bills of Lading the Contractor shall provide the Owner's Licensed Site Professional (LSP) all information required for preparation of electronic Bills of Lading. The Contract shall be responsible for preparation of Material Shipping Records. 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 reimburse the Owner for any and all fines associated with inaccurate, incorrect, or improperly completed waste manifests, including fines resulting from late or untimely submittals.

3. Disclose a summary of the history of compliance for each disposal/recycling 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. Prior to transporting any soils or fill material to a disposal facility the Contractor shall submit a letter from the disposal facility indicating that the facility has reviewed the available data and the generator's profile of the material and the facility agrees that it meets the facility's acceptance criteria.

5. Following off-site disposal of soil or fill materials at a disposal facility the Contractor shall submit Material Shipping Record or MCP Bill of Lading load log sheets signed by the facility.

6. Following disposal of all the soil represented by a Material Shipping Record or Bill of Lading, the Contractor shall submit that Material Shipping Record "Acknowledgment of Receipt by Receiving Facility" or Contractor shall arrange for receiving facility to electronically sign that Bill of Lading "Attestation of Disposal", as applicable, within 60 days of shipment.

PART 2 – PRODUCTS

2.1 GENERAL

A. Provide completed Bills of Lading, Material Shipping Records, manifests, certificates of disposal, weight slips and all other documentation relative to disposal, reuse, treatment or recycling of soil material.

PART 3 – EXECUTION

3.1 GENERAL

A. The Contractor shall reuse, recycle or dispose of all excess soil resulting from excavation activities in accordance with federal, state and local regulations and these specifications. Transport shall be by a permitted and licensed waste transporter. The Contractor shall be responsible for supplying the proper manifests to be approved and signed by a representative of the Owner.

B. Prior to disposal, it shall be the responsibility of the Contractor to maintain segregated waste stockpiles in conformance with all applicable federal, state, and local waste disposal regulations and as specified in Section 02080 - SOIL AND WASTE MANAGEMENT.

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 Engineer shall be responsible for obtaining the Owner's and receiving facilities' signature and all other signatures required for the proper completion of the manifests. The Contractor shall allow a minimum of five working days from the date of the submittal for any documents requiring the signature of the Owner and/or the LSP. The manifests shall document the handling of the waste from the time it is generated until the time it is properly disposed.

D. The Contractor shall be responsible for obtaining all federal, state, and local permits and variances to allow transport of materials on public roadways.

E. The Contractor shall be responsible to inform the Owner if hazardous waste disposal will not be performed within 60 days of hazardous waste characterization. This notification shall take place a minimum of 30 days

prior to the 60-day deadline. No hazardous waste stockpiled at the site shall remain on site more than 60 days after it is characterized.

F. The Contractor shall obtain certificates of disposal for all disposed waste.

G. Transportation of solid wastes shall be in compliance with any relevant federal, state and local special waste requirements, and such as to assure that waste material is not released during transit.

3.2 SOLID WASTES

A. Transporters of solid wastes that include, but are not limited to, contaminated soil/fill (including oil-contaminated soil/fill), construction and demolition debris, non-hazardous laboratory wastes, bottles, tires, metal parts, tree stumps, brush, and grass cuttings will utilize truck 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/fill or other solid waste being transported off-site. 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.

B. The disposal site shall be permitted by the state in which the facility is located to receive and dispose of solid waste, and shall be approved for use by the Owner. The Contractor shall provide copies of the disposal facility's operating permit.

C. Manifesting of solid waste shall be required and shall include 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 as required in the Code of Massachusetts Regulations (CMR) 310 CMR 40.0030, such as 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.

D. All solid waste shall be disposed in accordance with all applicable federal, state and local laws and regulations, as well as all other state laws through which the waste material is being transported.

E. Transport of soils in which asbestos containing materials have come to be located shall be transported and disposed of in accordance with Section 02080 – SOIL AND WASTE MANAGEMENT and all applicable local, state and federal laws and regulations.

3.3 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, 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.

3.4 DUST CONTROL

A. Dust control measures shall be implemented during loading and transport of waste material from the site in accordance with the contractor's Dust Control Plan, as specified in Section 02080 – SOIL AND WASTE MANAGEMENT.

PART 4 – COMPENSATION

4.1 GENERAL

A. Measurement and Payment for Transportation and Disposal of Soil and Fill items shall be as listed below. Payment for lump sum items and unit price items shall constitute full payment for all fees, labor, materials and equipment required to perform the work; all supervision; all overhead items including but not limited to bonds, insurance, labor burden, profit, protections and cautions are also included. Payment for unit price items shall be as detailed below and as measured by the Engineer. The Contractor shall be made aware that for Transportation and Disposal of Soil and Fill unit price items, the actual quantities encountered may vary significantly from the estimated quantities presented in the Bid Schedule. The estimated quantities presented have been established for bid comparison purposes only and do not represent a warranty of work. In the event of quantity changes, the unit bid price shall be the basis for compensation or credit.

B. The following unit price payment items are for transporting and disposing excess soils and fill material encountered during the course of this contract. Management of soil/fill shall be in accordance with applicable regulations and technical specifications. The costs associated with disposing excess soil and fill other than allowed for in the following payment items shall be incorporated into the contractor's Base Bid Item 2080.1- Soil Management. A

minimum unit bid cost has been established for each unit price bid item. The Contractor is required to review the minimum unit bid price and increase it within the bid table as the Contractor sees fit. The Contractor is not obligated to accept the minimum unit price indicated but shall not be able to reduce it. The minimum unit price established may be below actual market cost and is provided to avoid unbalanced bidding. The Contractor is required to review the minimum unit price presented and develop a competitive unit price for inclusion in the bid table. Any bids received which do not present a unit price entered by the Contractor within the bid table or present a unit price below the minimum unit price established, shall be rejected as non-responsive.

C. The quantity of any pay item expressed as tons shall be subject to verification by the Engineer by calculation of the in-place weight using the horizontal and vertical trench pay limits defined in the Contract Drawings, a bulking factor applicable to the soil type, and in place density tests supplied from a certified soil testing lab, hired by the Contractor. Should the quantity presented by the Contractor on the certified weight slips, be significantly more (i.e. greater than 10%) than that as determined through the Engineer's calculations, the Contractor shall be compensated for the lesser tonnage. The Contractor shall receive no additional compensation for material removed outside of the approved pay limits. The Owner, and/or their representative, shall have the right to perform independent weighing of trucks. No payments will be made in cases of incomplete documentation of disposal. Payment will be at the unit price established set in the FORMS FOR GENERAL BID.

D. The quantity of any pay item expressed as cubic yards shall be as measured by the Engineer, per the horizontal and vertical trench pay widths established in the Drawings, and confirmed through field engineering surveys performed by the Contractor. The Contractor shall receive no additional compensation for material removed outside of the approved pay limits. Payment will be at the unit price established set in the FORMS FOR GENERAL BID.

E. Preference is to be given to the most cost effective option of either reusing excavated material on-site as fill or disposal off-site.

02095.1 OHM Disposal of Soil- Less than RCS-1 (Class A):

Measurement for Payment for Disposal of Soil – <RCS-1 (Class A) shall be on the basis of tons of waste actually disposed, as measured at the disposal facility by certified scale, and documented on the return manifest or certified weight slip and accompanied by the appropriate Lading or Material Shipping Record form. Measurement shall be verified as described above and the lesser tonnage, as further described above, paid for. Material excavated outside of the pay limits indicated elsewhere in the Contract Documents or as directed by the Engineer shall be done at the Contractor's expense, at no additional cost to the Owner.

It is the intent that payment under this item shall be limited to soil/fill excavated on site, which is non-remediation waste as defined in the Massachusetts Contingency Plan and has

been determined through testing to be suitable for general reuse as fill. This pay item shall apply to material which is suitable for re-use off-site as fill and shall include the costs associated with characterizing the destination site as necessary to assess background conditions.

It is the intent that, if the analytical characteristics of the material meet the criteria for this classification, that the disposal be paid for at the unit price bid for this item. The Contractor shall use due diligence to identify a reuse location that meets the criteria identified in Section 02080 (Item 1.4 Definitions). Payment for disposal of the material at a higher unit price item shall be made only if the Contractor provides written certification that a reuse location that meets the criteria is not available; and only if approved in writing by the Engineer.

BASIS OF PAYMENT / INCLUSIONS:
Payment for OHM - Disposal of Soil – Less than RCS-1 (Class A) shall be based on the per ton price complete for this item in the proposal. Under the per ton price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for OHM - Disposal of Soil – Less than RCS-1 (Class A). The work includes, but is not limited to; handle, load, transport, and dispose at a facility in accordance with the facilities acceptance criteria, all soil/fill which is unsuitable for on-site reuse and is defined as less than RCS-1; placing, grading and compacting the material at the disposal site as specified; and all fees, permits, and taxes.

EXCLUSIONS:
The following items are not included for payment under this item; reuse of soil and fill material on site as backfill; furnishing and installing replacement imported backfill; staging; disposal of bituminous concrete; and disposal of construction debris.

2095.2 – OHM - Disposal of Soil – Daily Cover Unlined Landfill (Class B-1)

METHOD OF MEASUREMENT:
Measurement for Payment for OHM - Disposal of Soil – Daily Cover Unlined Landfill (Class B-1) shall be on the basis of tons of waste actually disposed, as measured at the disposal facility by certified scale, and documented on the return manifest or certified weight slip and accompanied by the appropriate MassDEP Bill of Lading form. Measurement shall be verified as described above and the lesser tonnage, as further described above, paid for. Material excavated outside of the pay limits indicated elsewhere in the Contract Documents or as required by the Engineer shall be done at the Contractor's expense, at no additional cost to the Owner.

It is the intent, that if the analytical characteristics of the material meet the criteria for this classification, but not that of lower levels of contamination, that the disposal be paid for at the unit price bid for this item. The Contractor shall use due diligence to identify a disposal facility that meets the criteria identified in Section 02080 (Item 1.4 Definitions). Payment for disposal of the material at a higher unit price item shall be made only if the Contractor provides written certification that a reuse location that meets the criteria is not available; and only if approved in writing by the Engineer.

BASIS OF PAYMENT / INCLUSIONS:
Payment for OHM - Disposal of Soil – Daily Cover Unlined Landfill (Class B-1) shall be based on the per ton price complete for this item in the proposal. Under the per ton price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for OHM - Disposal of Soil – Daily Cover Unlined Landfill (Class B-1). The work includes, but is not limited to; handle, load, transport, and dispose at an appropriately permitted, solid waste facility, all soil/fill which is unsuitable for on-site reuse and is defined as a non-hazardous solid waste suitable for reuse as daily cover at an unlined Massachusetts Landfill (as defined in MassDEP Policy #COMM-97-001); placing, grading and compacting the material at the disposal site as specified; and all fees, permits, and taxes.

EXCLUSIONS:
The following items are not included for payment under this item; transportation and disposal of soil and fill material which can be disposed of at the A level; reuse of soil and fill material on site as backfill; furnishing and installing replacement imported backfill; staging; disposal of bituminous concrete; and disposal of construction debris.

2095.3 – OHM - Disposal of Soil – Daily Cover Lined Landfill (Class B-2)

METHOD OF MEASUREMENT:
Measurement for Payment for OHM - Disposal of Soil – Daily Cover Lined Landfill (Class B-2) shall be on the basis of tons of waste actually disposed, as measured at the disposal facility by certified scale, and documented on the return manifest or certified weight slip and accompanied by the appropriate MassDEP Bill of Lading form. Measurement shall be verified as described above and the lesser tonnage, as further described above, paid for. Material excavated outside of the pay limits indicated elsewhere in the Contract Documents or as required by the Engineer shall be done at the Contractor's expense, at no additional cost to the Owner.

It is the intent, that if the analytical characteristics of the material meet the criteria for this classification, but not that of lower levels of contamination, that the disposal be paid for at the unit price bid for this item. The Contractor shall use due diligence to identify a disposal facility that meets the criteria identified in Section 02080 (Item 1.4 Definitions). Payment for disposal of the material at a higher unit price item shall be made only if the Contractor provides written certification that a reuse location that meets the criteria is not available; and only if approved in writing by the Engineer.

BASIS OF PAYMENT / INCLUSIONS:
Payment for OHM - Disposal of Soil – Daily Cover Lined Landfill (Class B-2) shall be based on the per ton price complete for this item in the proposal. Under the per ton price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for OHM - Disposal of Soil – Daily Cover Lined Landfill (Class B-2). The work includes, but is not limited to; handle, load, transport, and dispose at an appropriately permitted, solid waste facility, all soil/fill which is unsuitable for on-site reuse or disposal at one of the lesser unit price options and is defined as a non-hazardous solid waste suitable for reuse as daily cover at a lined Massachusetts Landfill (as defined in MassDEP Policy

#COMM-97-001); placing, grading and compacting the material at the disposal facility as specified; and all fees, permits, and taxes.

EXCLUSIONS:
The following items are not included for payment under this item; transportation and disposal of soil and fill material which can be disposed of at the A or B-1 levels; reuse of soil and fill material on site as backfill; furnishing and installing replacement imported backfill; staging; disposal of bituminous concrete; and disposal of construction debris.

2095.4 – OHM - Disposal of Soil – Non-Hazardous Solid Waste Asphalt Batching (Class B-3)

METHOD OF MEASUREMENT:
Measurement for Payment for OHM - Disposal of Soil – Non-Hazardous Solid Waste Asphalt Batching (Class B-3) shall be on the basis of tons of waste actually disposed, as measured at the disposal facility by certified scale, and documented on the return manifest or certified weight slip and accompanied by the appropriate MassDEP Bill of Lading form. Measurement shall be verified as described above and the lesser tonnage, as further described above, paid for. Material excavated outside of the pay limits indicated elsewhere in the Contract Documents or as required by the Engineer shall be done at the Contractor's expense, at no additional cost to the Owner.

It is the intent, that if the analytical characteristics of the material meet the criteria for this classification, but not that of lower levels of contamination, that the disposal be paid for at the unit price bid for this item. The Contractor shall use due diligence to identify a disposal facility that meets the criteria identified in Section 02080 (Item 1.4 Definitions). Payment for disposal of the material at a higher unit price item shall be made only if the Contractor provides written certification that a reuse location that meets the criteria is not available; and only if approved in writing by the Engineer.

BASIS OF PAYMENT / INCLUSIONS:
Payment for OHM - Disposal of Soil – Non-Hazardous Solid Waste Asphalt Batching (Class B-3) shall be based on the per ton price complete for this item in the proposal. Under the per ton price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for OHM - Disposal of Soil – Non-Hazardous Solid Waste Asphalt Batching (Class B-3). The work includes, but is not limited to; handle, load, transport, and dispose at an appropriately permitted, asphalt batching plant, all soil/fill which is suitable for recycling at an asphalt batching plant (as defined in MassDEP Policy WSC-94-400) and which is unsuitable for on-site reuse or off-site reuse or as daily cover at a Massachusetts Landfill; and all fees, permits, and taxes.

EXCLUSIONS:
The following items are not included for payment under this item; transportation and disposal of soil and fill material which can be disposed of at the A, B-1, or B-2 levels; reuse of soil and fill material on site as backfill; furnishing and installing replacement imported backfill; staging; disposal of bituminous concrete; and disposal of construction debris.

END OF SECTION 02095

SECTION 02100

SITE PREPARATION

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.

1.2 SUMMARY

A. This section includes the following:

1. Provide labor, material, tools and equipment to prepare site as indicated and specified.

2. Protection of existing trees and vegetation outside the limit of work and specifically designated trees and vegetation within the limit of work.

B. Related sections include the following:

1. Section 02210: Earth Excavation, Backfill, Fill and Grading.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 EXISTING TREES AND VEGETATION

A. Protect existing trees from damage.

B. Accept responsibility for damages outside these lines.

3.2 EXISTING STRUCTURES AND PROPERTY

A. Remove and reset at completion of project existing signs, posts, catchbasin frames and grates, manhole frames and covers, and granite curbing within construction path unless directed otherwise.

B. Store at a site designated by Owner, items in reusable condition as determined by Engineer.

3.3 STOCKPILES

A. Stockpiles shall be neatly trimmed and graded to provide drainage from surfaces and to prevent depressions where water may become impounded. All construction operations shall be performed to prevent mixing of objectionable materials with the topsoil, and stockpiles shall be protected and shall not be disturbed except for subsequent operations for replacing topsoil. The location of stockpiles shall be approved by the Owner and the Engineer.

3.5 CONTRACT CLOSEOUT

A. Provide in accordance with Section 01700.

END OF SECTION 02100

SECTION 02140

DEWATERING

2140.1 TREATMENT OF CONSTRUCTION DEWATERING DAY

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.

1.2 SUMMARY

A. This section includes the following:

1. Design, furnish, operate, maintain, and remove temporary dewatering systems to control groundwater and surface water to maintain stable, undisturbed subgrades, and allow work to be performed under dry and stable conditions and comply with permit and other regulatory requirements. Work to be done as part of dewatering includes, but is not limited to:

a. Lower the groundwater level within excavations to at least 2 feet below the bottom of the excavation.

b. Lower hydrostatic pressure.

c. Prevent surface water from entering the excavation during construction.

d. Limit settlement of utilities and adjacent structures.

e. Implement erosion and sedimentation control measures for disposing of discharge water.

f. Provide treatment system to treat all water removed from excavations, except water that is re-infiltrated to the ground on site in a manner that does not result in negative on- or off-site impacts.

g. Provide observation well and geotechnical implementation as specified and indicated or as otherwise required by the Engineer.

h. Provide an Environmental Site Professional/Dewatering Specialist/Field Representative (hereinafter referred to as the Dewatering Professional) who will be responsible for dewatering, reinfiltration, treatment and discharge of dewatering flows as specified and in compliance with all applicable permits and regulations.

i. Common dewatering methods include, but are not limited to, sump pumping, deep wells, well points, vacuum well points or any combinations thereof.

2. The Contractor shall be aware of groundwater under drains that may exist under all existing sanitary, storm, or combined piping. The Contractor shall identify such drains, bypass pump and dewater in accordance with the dewatering permits, and relocate and reconnect under drains upon completion of the work in the area.

3. Water removed from excavations shall be reinfiltrated to the ground if feasible. If reinfiltration is not feasible, treated water shall be discharged to the Massachusetts Water Resources Authority (MWRA) or local sewer system in accordance with the appropriate permit and regulations. In no case shall dewatering flows be directly or indirectly released to surface waters or storm drains prior to settling and appropriate additional treatment. Somerville is a combined sewer system; therefore, discharges to the drain system in addition to the sewer system require the MWRA construction dewatering discharge permit.

4. Related Sections:

a. Section 01300: “SUBMITTALS”
b. Section 02210: “EARTH EXCAVATION, BACKFILL, FILL, AND GRADING”
c. Section 02160: “TEMPORARY EXCAVATION SUPPORT SYSTEMS”.

1.3 SUBMITTALS

A. Shop Drawing: Submit the following in accordance with Section 01330 – SUBMITTALS:

1. Qualification of both the Contractor’s dewatering specialist or firm's qualifications (installation) and the Dewatering Professional (all other responsibilities) a minimum of four (4) weeks prior to execution of any dewatering. The submittal shall include, but not be limited to:

a. Qualifications of specialist or firm's Registered Professional Engineer as specified below.

b. Qualifications of the Dewatering Professional who shall oversee the installation, operation and maintenance of the dewatering system.

2. Submit a dewatering plan including design calculations at least four (4) weeks prior to start of any dewatering operation. 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. Dewatering plan and details stamped and signed by a Massachusetts Registered Professional Engineer that conform to the requirements of the dewatering permit(s), and all other applicable regulations and permits including, but not limited to, requirements for equipment, monitoring, sampling and reporting.

b. Submit a generalized plan of actions at least two (2) weeks before operation of the groundwater control system to be implemented in the event that the Threshold and Limiting values for groundwater lowering have been reached.

c. Certificate of Design.

d. A list of equipment including, but not limited to, pumps, prime movers, and standby equipment.

e. A description of the proposed method of dewatering; water reinfiltration; containment; treatment and discharge; and installation, monitoring, maintenance, and system removal procedures.

f. A groundwater monitoring plan shall be developed by the Professional Engineer retained by the Contractor that designs the dewatering system. The monitoring plan shall address groundwater control within the excavations and address settlements of utilities and adjacent structures.

g. A description of erosion/sedimentation control measures, and methods of disposal of pumped water.

h. List of all applicable laws, regulations, rules, and codes to which dewatering design conforms.

3. Data for the required discharge reports shall be collected by the Contractor's Dewatering Professional. It shall consist of periodic sampling and analysis of system influents, midfluents and/or effluents and discharge quantities and other requirements of the relevant permits. The Contractor's Dewatering Professional shall also coordinate analysis of samples at an appropriately certified analytical laboratory and shall comply with all permit reporting requirements.

4. A modified dewatering plan within 24 hours, if open pumping from sumps and ditches results in boils, loss of fines or softening of the ground.

1.4 QUALITY ASSURANCE

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified.

B. Employ the services of a Dewatering Professional and a Massachusetts Registered Professional Engineer having the following qualifications:

1. The Massachusetts Registered Professional Civil Engineer shall have completed the design of at least five (5) successful dewatering projects of equal size and complexity and with equal systems within the last five (5) years consisting of deep wells, well points, vacuum well points, and sump pumping for heavy Civil projects of similar size, type, and complexity in urban areas with the appropriate temporary support of excavation systems proposed by the Contractor including, but not limited to, trench boxes, soldier pile and lagging, timber sheeting support and secant pile support of excavation systems.

2. The dewatering systems installer supervisor shall have a minimum of 5 years experience in installation of well points, deep wells, recharge systems, or equal systems.

3. The Dewatering Professional responsible for day to day operation of the system shall have the following minimum qualifications:

a. Completion of at least 5 successful dewatering projects of equal size and complexity with equal systems within the last five (5) years consisting of system operation and troubleshooting, collection of readings, maintenance of logs and other required documents, collection of samples, coordination of analysis of samples, and compliance with reporting requirements during pumping for heavy Civil projects of similar size, type, and complexity in urban areas.

b. Valid certification from the Massachusetts Department of

Environmental Protection (DEP) to operate the proposed treatment system.

C. If subgrade soils are disturbed or become unstable due to dewatering operation or an inadequate dewatering system, notify the Engineer, stabilize the subgrade, and modify system to perform as specified at no additional cost to the Owner.

D. Notify the Engineer immediately if any settlement or movement is detected on any adjacent structures. If the settlement or movement is deemed by the Engineer to be related to the dewatering, take actions to protect the adjacent structures and submit a modified dewatering plan to the Engineer within 24 hours. Implement the modified plan and repair any damage incurred to the adjacent structures at no additional cost to the Owner.

E. If oil and/or other hazardous materials are encountered after dewatering begins, immediately notify the Engineer.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Provide groundwater monitoring wells in accordance with the submitted dewatering plan or as specified.

B. Provide casings, well screens, piping, fittings, pumps, power and other items required for dewatering system.

C. Provide sand and gravel filter around the well screen. Wrapping geotextile fabric directly around the well screen shall not be allowed.

D. When deep wells, well points, or vacuum well points are used, provide pumping units capable of maintaining high vacuum and handling large volumes of air and water at the same time.

E. Provide and store auxiliary dewatering equipment, consisting of pumps and hoses on the site in the event of breakdown, at least one (1) pump for every five (5) used.

F. Provide dewatering equipment, including an appropriately sized settling tank, and maintain erosion/sedimentation control devices as indicated or specified and in accordance with the dewatering plan.

G. Provide temporary pipes, hoses, flumes, or channels for the transport of discharge water to the discharge location.

H. Provide cement grout having a water cement ratio of 1 to 1 by volume.

PART 3 – EXECUTION

3.1 GENERAL

A. Execution of any earth excavation, installing earth retention systems, and dewatering shall not commence until the related submittals have been reviewed by the Engineer with all Engineer's comments satisfactorily addressed, the geotechnical instrumentation has been installed and baselines established and submitted to the Engineer, and the Dewatering Professional is on site and has begun the duties specified herein.

B. Furnish, install, operate, and maintain dewatering, re-infiltration, treatment and discharge systems as indicated or specified and in accordance with the dewatering plan. As no dewatering flows shall be discharged to surface waters either directly or indirectly without appropriate settling, at a minimum, the Contractor shall provide a settling tank with a capacity of 10,000 gallons, so that if pumping rates exceed discharge rates, sufficient storage capacity is available. Delays due to insufficient storage capacity will be at no additional cost to the Owner. The Contractor is responsible to evaluate available data and determine the necessary storage capacity so as to not impede construction activities.

C. Do not excavate until the dewatering system is operational.

E. Unless otherwise specified, continue dewatering uninterrupted until all structures, pipes, and appurtenances below groundwater level have been completed such that they will not be floated or otherwise damaged by an increase in groundwater elevation.

F. Discontinue open pumping from sumps and ditches, if such pumping is resulting in boils, loss of fines, softening of the ground, or instability of the slopes. Modify dewatering plan and submit to the Engineer at no additional cost to the Owner.

G. Where subgrade materials are disturbed or become unstable due to dewatering operations, remove and replace the materials in accordance with Section 02210 – EARTH EXCAVATION, BACKFILL, FILL, AND GRADING at no additional cost to the Owner.

3.2 DEWATERING DISCHARGE

A. Water to be infiltrated need not be treated. Contractor shall provide infiltration that complies with relevant local, state and federal regulations.

B. Transport pumped or drained water to discharge location in compliance with applicable permits and without interference to other work; damage to or

contamination of pavement, other surfaces, or property; erosion; or siltation.

C. Provide separately controlled pumping lines.

D. Immediately notify the Engineer if groundwater is encountered that is suspected to be contaminated with substances other than those for which the treatment system has been designed. Do not pump water found to be contaminated with oil or other hazardous material to the discharge locations.

3.3 COMPLIANCE WITH DEWATERING AND RELATED PERMITS AND REGULATIONS

A. Discharging groundwater and allowing for natural infiltration may not be a viable option for controlling groundwater in the project area. Should dewatering activities be required where the Contractor needs to discharge groundwater to a location other than the point of origin, then the Contractor shall be prepared to store, treat and discharge the water in accordance with applicable permits and regulations. Periodic sampling, as may be required to demonstrate treatment effectiveness and compliance with pretreatment standards specified in any local, state, or federal discharge permit required shall be the responsibility of the Contractor and its Dewatering Professional. Water that cannot be infiltrated is anticipated to be discharged to the MWRA system. The Contractor shall be responsible for seeking coverage under the appropriate MWRA construction dewatering permit. At a minimum, the Contractor shall be prepared to comply with the permit influent/effluent testing requirements. The Dewatering Plan shall include a description of procedures and information related to the collection of readings, maintenance of logs and other required documents. At a minimum, the dewatering plan shall describe compliance with relevant provisions of the MWRA construction dewatering permit obtained by the Contractor.

B. The Contractor, through its Dewatering Professional:

1. Shall furnish all labor, equipment and materials necessary to obtain accurate representative samples of the groundwater and for analysis for the set of analytical parameters specified above and as required by local, state and federal permits and regulations.

2. Shall coordinate sampling activities with the Engineer. The engineer reserves the right to sample treated and untreated dewatering flows at any time.

3. Shall take readings from the treatment system in accordance with the dewatering plan.

4. Shall collect an initial sample of untreated and treated groundwater at the beginning of dewatering activities within the construction area.

5. Shall prepare and keep in proper order all records required by regulatory authorities and permits.

6. Shall maintain logs and other records in accordance with the Specifications, regulatory agency and permit requirements, and the Dewatering Plan.

7. Shall coordinate analysis of samples by an appropriately certified analytical laboratory in accordance with the Specifications, regulatory agency and permit requirements, and the Dewatering Plan, and ensure that laboratory detection limits meet permit requirements.

8. Shall comply with reporting requirements in a timely manner and in the format required by the relevant permit. Reporting in compliance with permit requirements includes, but is not limited to, notification to the appropriate regulators and the Owner and Engineer prior to discharge; submittal of laboratory analytical reports for each sampling event; submittal of reports for each reporting period during which no discharge occurs; notification of non-compliant discharges; notification of termination of discharge; and response to permit-related questions posed by regulators or the Owner and Engineer.

    a. Water will be discharged under a MWRA Construction dewatering permit as applicable. The Contractor shall submit notifications and reports to the entities identified in the permit. Comply with pre-discharge notification, discharge reporting, notification of no discharge, and termination of discharge notification requirements; and respond to inquiries or correspondence from agencies regarding permit issues.

    b. If water will be discharged under a local permit, submit notifications and reports as required in the permit.

    c. For monthly or less frequent reporting deadlines, provide the Engineer with copies of all reports fourteen (14) days prior to the reporting deadline, and submit reports to the appropriate agency(ies) at the same. Provide copies of other dewatering documents to the Engineer immediately.

9. Install and maintain erosion/sedimentation control devices at the point of discharge as indicated or specified and in accordance with the dewatering plan.

10. The Contractor shall obtain all federal, state, county, and local permits and variances to allow transport of materials on public roadways, should such transport be necessary.

11. The Contractor shall dispose of all wastes resulting from construction

dewatering activities in accordance with local, federal and state regulations.

12. The Contractor is solely responsible for the implementation of the permit requirements, and is solely responsible for any punitive action resulting from any violation of the permit. The actual permit issued MWRA shall become part of this Contract by either addendum or by change order. If the actual permit is included by change order, no additional costs for implementing the permit will be considered by the Owner, when the actual permit is issued.

3.4 REMOVAL

A. Do not remove dewatering system without written approval from the Engineer.

B. Backfill and compact sumps or ditches with crushed stone wrapped with geotextile fabric in accordance with Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

C. All dewatering wells shall be abandoned upon completion of the work, and completely backfilled with cement grout.

PART 4 – COMPENSATION

2140.1 - Treatment of Construction Dewatering

METHOD OF MEASUREMENT:
Measurement for payment for Treatment of Construction Dewatering will be on a per day basis for treatment of dewatering, as measured by the Engineer. The Contractor shall be paid per day that the dewatering treatment system(s) is onsite and operational, as defined by this Section, as required by the applicable dewatering permits, and as required by the Owner or Engineer. The Contractor shall not be compensated when the dewatering treatment system is onsite when not required by the Engineer or not required by the applicable dewatering permits. A dewatering treatment system shall include a settling tank, granular activated carbon (GAC) unit, filters, meters, hose connections, hoses and other treatment apparatus.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Treatment of Construction Dewatering will be based on the unit price bid for this item in the proposal. Under the unit price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for treatment of construction dewatering complete, as required and as required by the Engineer. The work includes, but is not limited to: preparation, submittal, and receipt of an MWRA dewatering discharge permit; mobilization and demobilization of the complete system(s); design of the system(s); furnishing and installing treatment system(s); maintenance of the treatment system(s); "breakdown", transportation and set-up of the treatment system(s) between on-site areas requiring treatment; sampling; reporting; maintenance of all logs and other documentation required; laboratory testing; 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.

EXCLUSIONS

The Contractor shall not be compensated for construction dewatering under this item; including but not limited to re-infiltrated construction dewatering; providing, installing and maintaining pumps and hoses; installation and maintenance of well points, deep wells and pump filters and screens; temporary power sources and all incidental work. Construction dewatering shall be covered in the Contractor's base bid, at no additional cost to the Owner. The MWRA construction dewatering discharge permit fee shall be reimbursed under the applicable item of the Contract. This is a Treatment Item only.

END OF SECTION 02140

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 the allowable limits indicated, and protect from damage existing and proposed improvements including, but not limited to, pipelines, utilities, structures, roadways, and other facilities.

   The location, configuration, design, construction and maintenance of the excavation support walls and internal bracing shall be the sole responsibility of the Contractor.

2. The temporary excavation support system to be used on this project may include singular or multiple stages comprised of internally braced timber or steel sheeting, soldier piles and timber lagging. Trench boxes may not be used as temporary excavation support due to the proximity of the work to gas mains. Temporary excavation support system is, at a minimum, required at excavation locations within 25 feet of building walls, and where buried utilities are located within the soil wedge extending from the base of the excavation, upward to the ground surface at a slope of 2 horizontal to 1 vertical. Soldier piles and timber or steel sheeting shall be drilled or hydraulically pushed in place. No vibratory or impact hammers will be used to install the excavation support system. At excavation locations along the alignment outside 25 feet of existing building walls, other approved methods of excavation support system installation may be determined as acceptable after submittals by the Contractor have been submitted and reviewed, for informational purposes only, by the Engineer.

3. Wherever the word "sheeting" is used in this section or on the Contract Drawings, it shall be in reference to steel soldier piles and timber lagging or steel and timber sheeting support systems.

4. Construction of the temporary excavation support system shall not disturb the existing structures or the completed proposed structures. The Contractor, at no additional cost to the Owner, shall repair damage to such structures.

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.

6. Monitoring movement of the lateral support systems by optical survey techniques is required by an independent geotechnical monitoring consultant per specification 02015 until installation and backfilling is complete. Additional survey monitoring of the lateral support system may be required if movement (lateral or vertical) is measured following backfilling to the existing grade.

    a. In addition to monitoring the movement of the lateral trench support systems, where the 14-inch gas transmission main is exposed, it shall be monitored for movement and/or settlement for the entire time it is exposed.

7. If, in the Engineers judgment, the performance of the excavation support system is unacceptable, the Owner may instruct the Contractor to stop work and implement remedial measures to arrest further movements or restore groundwater levels to pre-construction levels. The Contractor shall take immediate steps to implement the remedial measures designed by the Contractor and reviewed by the Engineer. The costs for these measures shall be at no additional cost to the Owner.

8. Temporary excavation support systems shall be designed and installed in accordance with OSHA excavation safety standards.

1.2 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 – SUBMITTALS.

1. Submit the following qualifications three weeks prior to the construction:

    a. Qualifications of Contractor’s temporary excavation support system designer as specified below.

    b. Qualifications of Contractor’s temporary excavation support system installer as specified below.

2. Submit a temporary excavation support plan stamped and signed by a Professional Civil Engineer registered in the Commonwealth of

Massachusetts at least two weeks prior to start of the construction. Submit design calculations for review that 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. Drilled or hydraulically pushed in place excavation support system, 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

c. Requirements of dewatering during the construction.

d. Minimum lateral distance from the edge of the excavation support system for use for vehicles, construction equipment, and stockpiled construction and excavated materials.

e. List of equipment used for installing the excavation support systems.

3. Submit a Construction Contingency Plan specifying the methods and procedures to maintain excavation support system stability if the allowable movement of the adjacent ground and adjacent structures is exceeded.

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.

5. Estimates of the lateral and vertical displacements of the excavation lateral support systems under applied loads at critical stages.

6. Plans for preventing movement of the existing 4-inch, 12-inch, and

14-inch-diameter gas mains. Lateral support systems shall not come in contact with the gas mains or other utilities. In addition, the Contractor shall propose and submit for the Engineer's approval no less than 30 days prior to the start of excavation, the methods to be used to monitor movement and/or settlement of the exposed gas main.

1.3 QUALITY ASSURANCE

A. Provide in accordance with Section 01400 – QUALITY CONTROL 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 a Professional Civil Engineer registered in the Commonwealth of Massachusetts and having the following qualifications:

1. Not less than five years experience in the design of soldier pile and lagging and steel or timber sheeting temporary excavation support systems of at least 15 feet deep in urban areas of comparable type, size, and complexity as this project.

2. Completed not less than five successful soldier pile and lagging and steel or timber sheeting temporary excavation support system projects of comparable type, size, and complexity as this project within the last five years.

E. Temporary Excavation Support System Installer's Qualifications:

1. Not less than five years' experience in the installation of soldier pile and lagging and steel or timber sheeting temporary excavation support systems of at least 15 feet deep in urban areas of comparable type, size, and complexity as this project.

2. Completed not less than five successful soldier pile and lagging and steel or timber sheeting temporary excavation support system projects of comparable type, size, and complexity as this project within the last five years.

F. Install all temporary excavation support system under the supervision of a supervisor having the following qualifications:

1. Not less than five years' experience in installation of soldier pile and lagging and steel or timber sheeting temporary excavation support

systems of at least 15 feet deep in urban areas of comparable type, size, and complexity as this project.

2. Completed at least five successful soldier pile and lagging and steel or timber sheeting temporary excavation support system projects of comparable type, size, and complexity as this project within the last five years.

G. Provide pre-construction surveys in accordance with Section 01390 – PRE-CONSTRUCTION SURVEY.

1.4 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, traffic, temporary stockpiles, construction loads, and other surcharge loads.

2. Design internal bracing as needed to provide sufficient reaction to maintain stability.

3. Limit movement of buildings and buried utilities adjacent to the excavation support system to be within the allowable ground deformation as specified in Section 02015 – GEOTECHNICAL MONITORING AND INSTRUMENTATION.

4. Design the embedment depth below bottom of excavation to minimize lateral and vertical earth movements and provide bottom stability. Toe of unbraced temporary excavation support systems shall not be less than 5 feet below the bottom of the excavation.

5. Design temporary excavation support system shall withstand an additional 3 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. Permanent structure walls shall not be directly cast against excavation support walls.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01600 – PRODUCTS, MATERIALS AND EQUIPMENT and as specified.

B. 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.

1.6 PROJECT/SITE CONDITIONS

A. Subsurface investigation data are provided in the Contract Documents. The geotechnical data is made available to the Contractor for informational purposes only and shall not be interpreted as a warranty of subsurface conditions whether interpreted from written text, boring logs, or other data.

B. Prior to submitting a bid, the Contractor shall review and understand the information contained in the geotechnical data and all Contract Documents.

C. The Contractor shall draw their own conclusions regarding site conditions based upon site visit(s) and from available sources, for which the Owner and its Consultants assume no responsibility. The Contractor shall assume that subsurface conditions outside of subsurface exploration locations could differ from conditions shown in the records of the explorations.

D. The Contractor shall notify the Engineer immediately if obstructions are determined to conflict with the location of the excavation support system. Cobbles and boulders within dense well-bonded soils or other competent naturally deposited soils will not be considered obstructions.

E. The Contractor shall protect adjacent structures above ground and buried from damage associated with lateral support of excavation operations and other operations. Damage due to lateral excavation support operations or other Contractor activities shall be repaired immediately by the Contractor at his own expense.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Structural Steel

1. All soldier piles, wales, rakers, struts, wedges, plates, waterstop and accessory steel shapes shall conform to ASTM A36.

B. Timber Lagging

1. Structural grade having a nominal thickness of 3 inches and a minimum allowable working stress of 1100 psi.

C. Timber Sheeting

1. Structural grade having a nominal thickness of 4 inches and a minimum allowable working stress of 1100 psi.

D. Other Materials

1. Tamping tools adapted for backfilling voids after removal of the excavation support system.

2. Hydraulic, pneumatic or screw-jack shoring systems (Speed Shores) used to support excavations shall be in good working order and shall conform to all of the manufacturer's requirements for new equipment; bent or otherwise damaged supports, leaking hydraulic cylinders, or damaged sheeting shall not be used, and the Contractor shall immediately remove such damaged materials/equipment from the work site.

PART 3 – EXECUTION

3.1 GENERAL

A. Installation of the temporary excavation support system shall not commence until the Engineer has reviewed the related earth excavation and dewatering submittals with all Engineers' comments satisfactorily addressed.

B. Install excavation support system in accordance with the Contractor's temporary excavation support plan.

C. Carry out program of temporary excavation support in such a manner as to prevent undermining or disturbing foundations of existing structures, and of work ongoing or previously completed. Excavation support in trenches near the existing 14-inch diameter gas transmission main shall be installed to prevent the loss of soil under the gas main.

D. Perform preparatory work to discover, protect, maintain and restore, or remove utilities, foundations or other facilities located in close proximity of the proposed excavation lateral support system.

E. Conduct pre-excavation as necessary to remove obstructions and identify exiting utilities along the alignment of the excavation lateral support system which will interfere with installation in accordance with Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

F. The Contractor shall provide fully equipped rig(s) and appropriate tools in full-time operation at the site during the work, and shall mobilize additional equipment, if necessary, to complete the work on schedule.

G. Excavation shall not proceed more than 2 ft below the bracing level,

anywhere within the excavation support limits, until the entire level of bracing is completely installed, including prestressing.

H. Notify utility owners if existing utilities interfere with the temporary excavation support system. Modify the existing utility with the utility owner's permission or have the utility owner make the modifications at no additional cost to Owner.

I. All trench support shall be installed and maintained so it is in continuous contact with the earthen trench walls being supported.

3.2 SOLDIER PILES AND TIMBER LAGGING

A. Install steel soldier piles before starting excavation. Install soldier piles by drilling or hydraulically pushing to the design tip elevation. Driving by impact or vibratory hammers shall not be allowed. Drilled methods shall prevent loss of ground around the hole. Each soldier pile shall be installed in its drilled hole within 2 hours after drilling is completed to the required depth.

B. The Contractor shall have equipment on-site able to advance the drilled hole, for installation of the soldier piles, through sand below the water table, through concrete, and through large boulders and other obstructions which may be encountered.

C. Space soldier piles at intervals indicated on the Shop Drawings. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

D. Within the same day of seating the soldier piles in the drilled holes, encase the piles with MHD (1995) M4.08.0 – Controlled Density Fill, Type 1E from the tip elevations to the currently existing ground surface. Crushed stone or other granular materials are not acceptable.

E. Where SOE is to be left in place soldier piles shall be cut off five feet below the final ground surface prior to completion of the final backfilling operations.

F. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. As installation progresses, backpack the voids between the excavation face with sand and on-site soils to establish a tight contact. Pack louver openings between lagging with hay or other porous material to allow free drainage of groundwater without loss of retained soil or backpacking. In no case shall the louvered openings be allowed to exceed 1-inch.

G. Beginning at the top of the soldier piles, the maximum permissible height of unlagged face of excavation shall not exceed 2-feet in all soil types encountered at the site. If water is flowing from the face of the excavation, or if soil to be retained moves toward the excavation, the maximum height of

unlagged face shall not exceed 8-inches.

H. If unstable ground is encountered, take suitable measures (grouting behind the lagging or other approved method) to retain the material in place and prevent loss of ground or movements, which may cause damage to adjacent structures or utilities.

3.3 INSTALLATION – STEEL OR TIMBER SHEETING

A. Length Markings: Before installation is started each steel or timber section shall be marked so that the depth of the tip can be readily determined. This shall be accomplished by a method that is approved by the Engineer.

B. Sheeting shall be installed by means of hydraulically pushing each sheet piling to the required design depth. No impact or vibratory hammers will be allowed for installation of steel or timber sheeting on this project. The Contractor shall take all precautions against excessive vibrations in all areas. The Contractor shall be solely responsible for any damages caused directly or indirectly to structures, sewer and other utilities, and shall repair any such damage occurring due to his operations to the requirements of the Owner.

C. All sheeting shall be protected from damage during installation.

D. All sheeting shall be hydraulically pushed to its full depth ahead of the excavation 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 structural fill and thoroughly compacted.

E. The Contractor shall provide all inspection equipment to determine whether the sheeting has been started in their planned location, are vertical, and are within the allowable tolerance for position after installation.

F. Requirements for the sheeting include the following:

1. Install sheeting in the plumb position.

2. Install sheeting such that the piling is in direct contact with the material to be retained.

3. Install sheeting to the depths indicated on approved Shop Drawings.

4. Methods and equipment used in pushing, setting, cutting and splicing shall conform to approved Shop Drawings.

5. Use templates or other temporary alignment facilities to maintain piles plumb and on line.

6. Control vibrations and noise associated with installation.

7. Pre-excavate as necessary to remove existing structures along alignment of the sheeting.

8. Sheeting shall be positioned within 3 inches of the design plan location along its length from top down to bottom of excavation grade. Design plan locations are to be established by the Contractor's Professional Engineer and submitted to the Engineer for review.

3.4 INTERNAL LATERAL WALL BRACING (WALES AND STRUTS)

A. Use walers and struts as necessary to provide support of the excavation lateral support walls as required. Include web stiffeners, plates, brackets, or angles as required to prevent rotation, crippling or buckling of connections and points of bearing between structural steel members. All for eccentricities due to fabrication and assembly. Consider effects of temperature changes.

B. Install and maintain all support members in continuous tight contact with each other and with the earth wall being supported.

C. Coordinate locations of all bracing and components thereof for temporary lateral excavation support with locations of permanent structures.

D. Control rate of excavation and installation of support members to minimize movement of adjacent ground surface.

E. Excavation shall proceed in accordance with the detailed sequence submitted by the Contractor and reviewed by the Engineer. It shall be the responsibility of the Contractor to schedule and sequence the work accordingly.

3.5 LATERAL TRENCH SUPPORT ADJACENT TO AND UNDER 14-INCH GAS TRANSMISSION MAIN

A. Lateral trench support adjacent to and under the 14-inch-diameter gas transmission main shall be furnished and installed in accordance with the Contractor's submittal submitted and reviewed under paragraph 2.1 of this Section.

B. All trench support shall be installed and maintained so it is in continuous contact with the earthen trench walls being supported. Trench boxes may not be used for temporary shoring.

C. Installation, maintenance and removal of the lateral trench support shall be coordinated with the exposure and support of the gas transmission main

D. Contractor shall control the rate of the trench excavation and removal of the support system to minimize the movement of permanent structures and the

adjacent ground surface.

3.6 MONITORING

A. As proposed by the Contractor and approved by the Engineer.

B. In the event the monitoring system proposed by the Contractor proves ineffective, the Contractor shall implement additional measures as required by the Engineer at no additional cost to the Owner.

3.7 REMOVAL OF EXCAVATION SUPPORT SYSTEM

A. Where sheeting cannot be removed without damage to the gas transmission main or work recently installed or other facilities it shall be left in place with the exception of the top 5 ft. of excavation support wall below final grades, which shall be removed, unless otherwise approved by the Engineer.

B. Remove excavation support in a manner that will maintain support as excavation is backfilled and will not leave voids in the backfill.

C. Do not begin the removal of the excavation support system until it can be safely removed damage to existing facilities, completed work or adjacent property.

D. Fill any void left by the shoring system or voids created by the removal of the shoring system to provide soil support between the trench backfill and the native soil.

E. Sheet piling removal must be performed in a manner that will avoid “vibro-consolidation” (densification) of sandy or granular material below or adjacent to the excavation that could lead to settlement and damage of the pipeline, the gas transmission main, other works of construction and adjacent property.

PART 4 – COMPENSATION (Not Used)

END OF SECTION 02160

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SECTION 02210

EARTH EXCAVATION, BACKFILL, FILL AND GRADING

2210.1	**TEST PITS**	**CUBIC YARD**
2210.2	**CONTROL DENSITY FILL FOR BACKFILL**	**CUBIC YARD**
2210.3	**GRAVEL SUBBASE**	**CUBIC YARD**
2210.4	**OVEREXCAVATION OF GEOTECHNICALLY UNSUITABLE**	**CUBIC YARD**

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the following:

1. The Work shall consist of excavation of all materials removed within the limits of the Contract in accordance with the Specifications and in close conformity with the lines, grades, thickness and cross sections shown on the plans or established by the Engineer.

2. The Contractor shall comply with all applicable laws, rules, ordinances, and general regulations of the Federal Government, the Commonwealth of Massachusetts, the City of Somerville, the Somerville Department of Public Works, DEP, EPA, OSHA, and other regulatory agencies having jurisdiction over the Work.

3. Provide materials for backfilling excavations as indicated and specified.

4. Grade surfaces to meet finished grades indicated. Grade roadway and site as to maintain them in a level unrutted condition and to eliminate puddling of surface and subsurface water.

5. The Engineer will provide exact test pit locations during construction.

1.2 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Submit an Excavation, Backfilling, Grading and Compaction plan at least two weeks 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:

i. Detailed sequence of work.

ii. General description of construction methods.

iii. Numbers, types, and sizes of equipment proposed to perform excavation, backfilling, grading and compaction.

iv. Details of dust control measures.

v. Proposed locations of stockpiled excavation and/or backfill materials.

vi. Proposed surplus excavated material off-site disposal areas and required permits.

vii. Erosion and sedimentation control measures, which will prevent erosion and sedimentation during the earth moving and soil stockpile activities.

B. Backfill Materials: Submit a 20 lb. sample, grain size analysis and moisture density curve performed in accordance with ASTM D422 and compaction test results (ASTM D1557 Procedure C) for each proposed source of backfill, imported material and on-site material to be reused, for review by the Engineer at least, one week prior to use of the material. The grain size analysis shall indicate that the backfill material conforms to the gradation requirements specified.

1. In addition, a certification statement and analytical results shall accompany each physical sample of earth materials to be imported onto the site, including but not limited to crushed stone, loam, bedding sand, gravel sub-base, common fill and structural backfill. At a minimum the certification shall state the point of origin and that the material is free of contaminants. The certification shall include representative sample analysis from each point of origin of backfill to be used on the site. The sample(s) shall be analyzed by a certified laboratory for RCRA 8 metals, volatile organic compounds (EPA Method 8260), semi-volatile organic compounds (EPA Method 8270), petroleum hydrocarbons (EPA Method 8100), and Total PCBs and pesticides (EPA Method 8081 and 8082). On-site soils defined as suitable for reuse in this Section and in Section 02080 – SOIL AND WASTE MANAGEMENT can be used as backfill without providing the certification required above.

2. All sampling of soils for chemical testing shall be performed by a person experienced in sample collection and shall be either: 1) a Licensed Site Professional registered in the Commonwealth of

Massachusetts; 2) a Professional Engineer registered in the Commonwealth of Massachusetts; 3) a professional Geologist registered in the Commonwealth of Massachusetts; 4) a certified groundwater/environmental professional; or 5) an authorized representative of the one of the persons listed above. Samples of each material shall be submitted to a chemical analytical laboratory, certified by the Massachusetts Department of Environmental Protection.

3. Submit additional samples and geotechnical and analytical test data and certifications for every 1000 cubic yards (every 200 cubic yards for moisture density curves) of material imported or reused on-site or anytime consistency of material changes in the opinion of the Engineer. Submit associated chemical laboratory data on the imported materials throughout the course of the Work, if requested by the Engineer, to evaluate the consistency of the source or process, at no additional cost to the Owner.

4. Controlled Density Fill Mix Design: Prior to beginning the work the Contractor shall submit for review, controlled density fill mix designs which shall show the proportions and gradations of all materials proposed for each class and type of controlled density fill specified herein.

5. Filter Fabric: Submit shop drawings and product data sheets.

C. During Construction, submit written confirmation of fill lift thickness, in-place soil moisture content, and percentage of compaction to the Engineer before placing the next lift or constructing foundations.

D. Submit Qualifications of the Contractor's Independent Testing Laboratory as specified in Paragraph 1.5.K, three weeks prior to the execution of any earth excavation, backfilling, filling, or compaction process.

1.3 DEFINITIONS

A. Suitable Material: Material which does not contain organic silt or organic clay; peat; vegetation; wood or roots; stones or rock fragments over 6-inch in diameter; porous biodegradable matter; loose or soft fill; excavated pavement; or refuse. Material for backfill shall conform to the gradation requirements specified herein.

B. Unsuitable Materials: Materials that do not comply with the requirements for the acceptable material or which cannot be compacted to the specified or indicated density.

C. Percentage of compaction is defined as the ratio of the field dry density, as

determined by ASTM D1556 or ASTM D2922 to the maximum dry density determined by ASTM D1557 Procedure C, multiplied by 100.

D. Proof Roll: Compaction with a minimum of four passes of a vibratory steel drum roller. Vibratory plate compactors shall be used in small areas where a vibratory steel drum roller cannot be used.

1.4 REGULATIONS

A. The Contractor shall be solely responsible for making all excavations in a safe manner. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P) and State requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.

B. Comply with all applicable laws, rules, ordinances, and general regulations of the Federal Government, the Commonwealth of Massachusetts, the City of Somerville, the Somerville Department of Public Works, DEP, EPA, OSHA, and other regulatory agencies having jurisdiction over the Work.

1.5 QUALITY ASSURANCE

A. Dewatering and Groundwater Control: Provide and maintain as specified in Section 02140 - DEWATERING.

B. Excavations shall be performed in the dry, and kept free from standing water, snow and ice during construction.

C. Temporary Excavation Support Systems: Provide and maintain as specified in Section 02160 – TEMPORARY EXCAVATION SUPPORT SYSTEMS

D. Do not excavate or fill until the Engineer has reviewed all the required submittals.

E. Formulate excavation, backfilling, and filling schedule and procedures to eliminate possibility of undermining or disturbing foundations of partially and completed structures, pipelines and embankments or existing structures and pipelines.

F. Cut pavement and all surface materials to the top of the existing fill material with a saw to prevent damage to remaining pavement without extra compensation. Surface materials may include concrete slabs, cobblestones, rails and other miscellaneous materials. Where pavement is removed in large pieces, dispose of pieces before proceeding with excavation.

G. Dig test pits considered separate to the normal excavation as required to locate underground utilities, obstructions or water table.

H. If material for foundation support is found to be unsuitable, as defined in these Specifications, at or below the grade to which excavation would normally be carried in accordance with the drawings and/or specifications, remove such material to the width and depth as required by the Engineer and replace it with crushed stone wrapped in filter fabric.

I. During progress of work, conduct earth-moving operations and maintain work site so as to minimize the creation and dispersion of dust.

J. Bedding and backfill material shall not be placed in water. Water shall not be allowed to rise upon or flow over the bedding and backfill material.

K. Employ an independent testing laboratory to perform particle size and gradation analyses, in accordance with ASTM D422, as well as compaction testing. The independent testing laboratory shall have the following qualifications:

1. Be accredited by the American Associates of State Highway and Transportation Officials (AASHTO) Accreditation Program;

2. Have three years experience in sampling, testing and analysis of soil and aggregates, and monitoring field compaction operations;

3. Able to provide three references from previous work.

1.6 AVAILABLE INFORMATION

A. Prior to submitting his bid, the Contractor shall review and understand all available information possible. Subsurface exploration data is made available to the Contractor for informational purposes only and shall not be interpreted as a warranty of subsurface conditions whether interpreted from written text, boring logs, or other data. The subsurface data represent conditions only at the sampling locations at the times the explorations were conducted.

B. Neither the Owner nor Engineer shall be liable for any error or discrepancy in the subsurface information provided, nor for the Contractor's use or interpretation of the information. Additional test borings, test pits or other exploratory operations may be made by the Contractor with the written approval of the Owner, at no additional cost to the Owner.

1.7 MATERIAL TESTING

A. Moisture Density - One per source, except for crushed stone. Repeat the moisture density test for every 200 cubic yard of material used, and whenever visual inspection indicates a change in material gradation as required shall be as determined by the Engineer.

B. Gradation Analysis - A minimum of one per source, for each moisture density test, for every 100 cubic yards of material used, and whenever visual inspection indicates a change in material gradation. For on-site fill soil, the Engineer shall determine frequency of tests required.

C. Construction Tolerances: Construct finished surfaces to plus or minus 0.5 inches of the elevations indicated. Provide the Engineer with adequate survey information to verify compliance with above tolerances.

1.8 FIELD TESTING

A. Field Testing and Inspections: By Contractor's independent testing laboratory, acceptable to the Engineer, at Contractor's expense as specified. Location of tests shall be mutually acceptable to testing laboratory and the Engineer or as required by the Engineer. In the event compacted material does not meet specified in-place density, recompact material and retest this area until specified results are obtained at no additional cost to the Owner.

B. Methods of Field Testing: In-Place Density: ASTM D1556, ASTM D2167, or ASTM D2922; In-Place Moisture Content: ASTM D3017, ASTM D4944, or ASTM D4959; Material Testing Frequency: The following testing frequencies are minimum required for all structural and non-structural fill materials.

C. Field In-Place Density and Moisture Content - Crushed stone shall be compacted as specified and indicated. For other backfill and fill materials, minimum test frequency shall be as follows, and no less than two tests per lift:

1. Trenches under structures, or roadways subbase: Every 30 lin. ft. per lift.

2. Trenches in areas without structures or roadways: Every 50 lin. ft. per lift.

3. Under Structure: Every 100 sq. ft. per lift.

4. Around Structures: Every 100 sq. ft. per lift.

PART 2 – PRODUCTS

2.1 SAND BORROW

A. Sand borrow shall consist of clean, inert, hard, durable grains of quartz or other hard durable rock free from clay and loam or other deleterious or organic material. Sand borrow shall be used as pipe bedding for all pipe with the exception of Reinforced Concrete Pipe, placed between 6 inches below pipe invert to 6 inches above pipe crown. The sand borrow shall conform to Massachusetts Highway Department (MHD) Specification Designation, M1.04.1, and the following gradation:

Sieve Size	Percent Passing by Weight
½-inch (12.7mm)	100
3/8-inch (9.525mm)	85-100
No. 4	60-100
No. 16	35-80
No. 50	10-55
No. 200	2-10

2.2 COMMON FILL AND ON-SITE MATERIAL GEOTECHNICALLY SUITABLE FOR REUSE ON-SITE AS BACKFILL:

A. Common fill and on-site material geotechnically suitable for reuse on-site as backfill shall be used from the top of the sand borrow or crushed stone and below the gravel subbase layer.

Common fill and on-site material geotechnically suitable for reuse on-site as backfill shall consist of sand and gravel consisting of hard durable particles, and free from trash, ice and snow, tree stumps, roots and other organic matter, and shall conform to the following gradation requirements:

Sieve Size	Percent Finer by Weight
6-inch (152.4mm)	100
No. 4	30-80
No. 40	30-50
No. 200	0-25

2.3 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. Crushed stone shall be used as Reinforced Concrete Pipe bedding between 6 inches below pipe invert to 6 inches above pipe crown and initial 12 inches of backfill under structures, and as a working mat or as a filter around perforated drain pipe.

Crushed stone shall be wrapped in filter fabric, placed in maximum 6-inch thick layers, loose measure, and compacted with a minimum of four passes of a vibratory plate or roller compactor. The crushed stone shall be uniformly blended and shall conform to the following requirements.

Sieve Size	Percent Passing by Weight
1-inch (25.4 mm)	100
3/4-inch (19.05 mm)	90-100

Sieve Size	Percent Passing by Weight
5/8-inch (15.875 mm)	---
½-inch (12.7 mm)	10-50
3/8-inch (37.5 mm)	0-20
No. 4	0-5
No. 8	---

2.4 CONTROLLED DENSITY FILL (CDF)

A. Controlled density fill shall consist of a cementitious hard excavatable mixture of aggregate, Portland Cement, and air entraining admixtures. The material shall be of the type specified in Massachusetts Highway Department 1995 Standard Specifications for Highway and Bridges, as amended, Type 2E. Controlled density fill shall be used as fill to at least 2 feet above the crown of any existing utility for areas where compaction cannot be achieved using mechanical compaction. Controlled density fill shall also be used to fill abandoned utilities, encasement of pipe and utilities, and around the excavation support systems as required by the Engineer.

B. Controlled density fill placed in contact with ductile iron pipe shall utilize a non-fly ash mix design.

2.5 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 be used for replacement of unsuitable material below pipe inverts and below structures. Structural fill shall conform to the following gradation requirements.

Sieve Size	Percent Passing by Weight
3-inch (76.2 mm)	100
No. 4	40-80
No. 40	10-30
No. 200	0-8

2.6 FILTER FABRIC

Filter Fabric used, as a drainage medium shall consist of a nonwoven fabric made from polypropylene or polyethylene filaments or yarns. The fabric shall be inert to organic chemicals commonly encountered in the soil. The fabric shall conform to the following recommended property tests:

Property	Unit	Test Method	Minimum Value
Weight	oz/sy	ASTM D-3776	4.5
Grab Strength	Lbs	ASTM D-4632	120
Grab Elongation	percent	ASTM D-4632	55
Trapezoid Tear Strength	Lbs	ASTM D-4533	50
Mullen Burst Strength	Psi	ASTM D-3786	210
Puncture Strength	Lbs	ASTM D-4833	70

Edges and ends of filter fabric shall overlap a minimum of two feet.

2.7 GRAVEL SUBBASE

Gravel subbase shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The gravel subbase shall be used in the upper one foot of trench backfill material immediately below pavements and graded in accordance with Massachusetts Highway Department (MHD) specification section M1.03.1 as indicated below:

Sieve Size	Percent Passing by Weight
3-inch	100
1-1/2-inch	70-100
3/4-inch	50-85
No. 4	30-60
No. 200	0-10

PART 3 – EXECUTION

3.1 GENERAL

A. Do not excavate or fill until the Engineer has reviewed all the required submittals.

3.2 SITE MAINTENANCE

A. Roadway and Site Leveling: Grade roadway and site as to maintain them in a level unrutted condition and to eliminate puddling of surface and subsurface water.

3.3 SUBGRADE PREPARATION AND PROTECTION

A. Proof roll with a vibratory plate compactor or double drum roller (4 passes) the exposed subgrade prior to backfilling and filling operation, or placing soil-supported pipeline. Proof rolling shall be performed in the presence of the Engineer.

B. As required by the Engineer, over-excavate any unsuitable materials below the subgrade, and replace with compacted structural fill. Refer to Part 1.1.A.6 of this Specification Section for extent of this work.

C. Use excavating equipment equipped with a toothless or smooth edged, excavating bucket to expose the pipe trench subgrade to avoid disturbance of the bearing surface.

D. Backfill the overexcavation with Crushed Stone or Structural Fill and compact as to the degree indicated herein.

3.4 COMPACTION EQUIPMENT

A. The compaction equipment shall be selected by the Contractor, and shall be capable of consistently achieving the specified compaction requirements. The selected compaction equipment shall meet the following minimum requirements:

1. Manually operated vibratory plate compactors weighing no less than 200 pounds with vibration frequency no less than 1600 cycles per minute.

2. Vibratory steel drum roller weighing at least 12,000 pounds.

3. Water jetting and puddling will not be allowed.

3.5 COMPACTION REQUIREMENTS

A. The degree of compaction is expressed as a percentage of the maximum dry density at optimum moisture content as determined by ASTM Test D1557, Procedure C. The compaction requirements are as follows:

Area	**ASTM Density Degree of Compaction**
Natural subgrade	Proof roll
Crushed stone	As specified herein
Sand Borrow	As specified herein
Gravel subbase	95%

Area	**ASTM Density Degree of Compaction**
General backfill with CDF adjacent to structures	As specified herein
Trench backfill (on-site fill) - below pavements - below landscaped areas	 95% 90%
Other areas	90%

B. Moisture Control: Fill that is too wet for proper compaction shall be desiccated, 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 at no additional cost to the Owner.

C. 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.

D. Unfavorable Conditions: In no case shall fill be placed in standing water, over unsuitable material, or 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.

E. 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.

F. Compaction Control: In-place density tests shall be made at the Contractor's expense 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.

G. 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.

H. Placement: 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 trench sidewalls in order to avoid the formation of a shear plane.

I. Surfaces: After backfilling trenches and excavations, the Contractor shall maintain the surfaces of backfill area in good condition so as to present a smooth surface at all times level with adjacent surfaces. The Contractor shall repair any subsequent settling over backfilled area 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.

J. 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.

3.6 SEPARATION OF EXCAVATED MATERIAL FOR REUSE

A. Carefully remove acceptable material from excavated areas and store separately for further use as backfill material or for disposal or immediately reuse at the area of excavation as backfill.

B. Reuse surplus acceptable excavated materials for backfill as indicated and in accordance with Section 02080 – SOIL AND FILL MANAGEMENT; deposit neatly and grade.

3.7 BACKFILL MATERIAL SELECTION

A. Backfill Material Selection: Unless otherwise specified or required, material used for filling and backfilling shall meet the requirements specified under Backfill materials. In general, the material used for backfilling trench excavations within the zone above structures and 6 inches above pipe crowns shall be material removed from the excavation provided that the reuse of these materials result in the required trench compaction and meets the gradation requirements specified for on-site fill. In areas where the bottom of the excavation is in silt and clay, and is below the groundwater table, a working mat and drainage layer of 12 inches of compacted crushed stone wrapped in filter fabric shall be placed.

B. Place backfill to a maximum loose lift thickness of 9 inches except where used as pipe bedding. Maintain backfill material with a uniform moisture content, with no visible wet or dry streaking, between plus or minus 2 percent 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.

3.8 STRUCTURE AND TRENCH BACKFILL

A. The trenches shall be backfilled as soon as practicable with the material specified herein. All trench backfilling shall be done with special care, in the following manner and as required by the Engineer.

B. Backfill material for pipe bedding shall be deposited in the trench, uniformly on both sides of the pipe, for the entire width of the trench as indicated on the drawings. Sand borrow bedding 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. Crushed stone bedding material shall be placed in layers not more than 6-inches thick in loose measure, and compacted with at least 4 passes using a vibratory plate or roller compactor.

C. The trench shall be backfilled with quick-set CDF to 2 feet above the crown of any utility crossing the trench in areas where compaction cannot be achieved using mechanical compaction equipment. Backfill shall be placed in appropriately sized lifts and on both sides of the utility simultaneously to ensure that all loads applied to the main by the backfill are properly balanced and that they do not exceed the safe load carrying capacity of the main at any time.

D. The balance of the trench with no structures shall be common fill material placed in 9-inch think lifts and compacted up to the bottom of the gravel subbase layer. The common fill material shall be spread in layers not exceeding 9-inches in loose depth and each layer thoroughly compacted by mechanical methods and shall contain no rock, stones or boulders larger than 6-inches in their greatest dimension.

E. 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, 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. Backfill shall be made to grades required to establish the proper subgrade for the placement of topsoil or pavement base courses.

F. In backfilling trenches, each layer of backfill material shall be moistened and compacted to a density as specified herein, 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.

G. 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.

H. During filling and backfilling operations, pipelines 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 to meet Engineer and Owner requirements at no additional cost to the Owner.

3.9 BACKFILLING AGAINST STRUCTURES

A. 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, the Contractor, as required by the Engineer, shall make special leakage tests of the structures. 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 CDF Material.

B. Symmetrical backfill loading shall be maintained. Special care shall be taken to prevent any wedging action or eccentric loading upon or against the structures.

C. 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 remedied by the Contractor at no additional expense to the Owner.

3.10 CDF QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Slump: ASTM C143; one test at point of discharge for each day's placement; additional tests when CDF consistency seems to have changed.

B. Compression Test Specimen: ASTM C31; one set of four (4) standard cylinders for each compression strength test, plus additional sets for each 100 cu yds more than the first 50 cu yds placed in any one day unless otherwise required.

C. Compressive Strength Tests: ASTM C39; one set for each day's pour plus additional sets for each 100 cu. yds more than the first 50 cu. yds placed in any one day; two specimens tested at 28 days, and two specimens tested at 90 days.

D. Test results will be reported in writing to Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of placement, name of testing service, fill type and class, location of fill batch along route, design compressive strength limits at 28 days and 90 days, fill mix

proportions and materials, compressive breaking strength, and type of break for both 28 day tests and 90 day tests.

3.11 TRENCH EXCAVATION

A. For pipe installation in a cradle or within bedding, excavate trench by machinery to, or just below designated subgrade. If material remaining at bottom of trench is disturbed, recompaction shall be required.

B. When pipe is to be laid directly on bottom of trench, do not excavate lower part of trenches by machinery to subgrade. Remove remainder of material to be excavated by use of hand tools just before placing of pipe. Form a flat or shaped bottom, true to grade, so pipe will have a uniform and continuous bearing. Support on firm and undisturbed material between joints, except for limited areas where use of pipe slings have disturbed bottom.

C. Make trenches as narrow as practicable and do not widen by scraping or loosening materials from the sides. Make every effort to maintain sides of trenches firm and undisturbed until backfilling has been placed and compacted.

D. Excavate trenches with approximately vertical sides between springline of pipe and elevation 1 ft. above top of pipe.

3.12 EXCAVATION AT GAS TRANSMISSION MAINS

A. Caution shall be used during trench excavation for the installation of sewer where it crosses the gas transmission main.

B. Hand excavation methods shall be used within 3 feet horizontally of the transmission main pipe. Hand excavation methods shall also be used within a soil wedge delineated by a downward line at 45 degree angle drawn from the springline of the transmission main.

C. Trenchless methods for the installation of sewers crossing the gas transmission main will not be allowed.

3.13 EXCAVATION NEAR EXISTING STRUCTURES

A. Discontinue digging by machinery when excavation approaches pipes, conduits, or other underground structures. Continue excavation by use of hand tools. Include such manual excavation in work to be done when incidental to normal excavation and under items involving normal excavation.

B. Excavations to remove unsuitable material shall not extend within a 2 horizontal to 1 vertical (2H:1V) envelope below existing structures to remain.

C. Excavate test pits when determination of exact location of pipe utilities or other underground structures is necessary for doing work properly.

D. Execution of any earth excavation shall not commence until the related dewatering, soil and fill management, excavation support systems, and required backfill and fill materials submittals are reviewed by the Engineer and all Engineers' comments addressed.

E. Carry out program of excavation, dewatering, and excavation support systems to eliminate possibility of undermining or disturbing foundations of existing structures or utilities of the work previously completed under this contract.

F. Excavate to widths that give suitable room for constructing structures or laying and jointing piping.

G. Do not plow, scrape or dig by machinery near to finished subgrade in a manner that would result in disturbance of subgrade.

H. Excavate to lines and grades indicated in an orderly and continuous program.

I. Establish limits of excavation to allow adequate working space for installing forms and for safety of personnel.

J. Excavate to elevations indicated, or deeper, as required by the Engineer, to remove unsuitable subgrade material.

K. Exercise care to preserve material below and beyond the lines of excavations.

L. Boulders, rock fragments, and concrete less than one-half cubic yard encountered during excavation shall not be included for payment as rock.

3.14 REMOVAL OF SUBSURFACE OBSTRUCTIONS

A. Remove indicated or approved subsurface structures and related obstructions to complete the work.

B. Promptly notify the Engineer when any unexpected subsurface facilities are encountered during excavation such as utility lines and appurtenances, walls and foundations.

3.15 UNAUTHORIZED EXCAVATION

A. When the bottom of any excavation is excavated beyond limits indicated or specified, backfill with crushed stone wrapped with non-woven geotextile fabric. No additional payment will be made for the excavation of backfill or unauthorized excavation.

3.16 CARE AND RESTORATION OF PROPERTY

A. Restore all surfaces damaged by the Contractor's operations, including paved surfaces damaged by the treads of the Contractor's equipment, to a condition at least equal to that in which they were found immediately before work commenced. Use suitable materials and methods for such restoration.

3.17 POLLUTION CONTROL

A. During progress of work, conduct earth-moving operations and maintain work site so as to minimize the creation and dispersion of dust.

B. Separation of Excavated Material for Reuse: Remove only existing pavement and all other surface materials, which may include concrete slabs, cobblestones, rail ties, by saw cutting that is necessary for prosecution of work.

PART 4 – COMPENSATION

Item 2210.1 - Controlled Density Fill for Backfill

METHOD OF MEASUREMENT:
Measurement for payment for Controlled Density Fill for Backfill shall be made on the basis of cubic yards placed within the trench width pay limits shown indicated elsewhere in the Construction Documents or as otherwise approved by the Engineer.

BASIS OF PAYMENT / INCLUSIONS:
Payment for Controlled Density Fill for Backfill shall be based on the cubic yards installed complete for this item in the proposal. Under the per cubic yard price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for Controlled Density Fill for Backfill. The work includes, but is not limited to; furnish and install controlled density fill for backfill under existing utilities, encasement of shallow pipe and utilities, and in areas of difficult compaction, and where required by the Engineer.

EXCLUSIONS:
Controlled Density Fill used for the abandonment of pipes and structures is paid for under a separate item.

Item 2210.3 – Overexcavation of Geotechnically Unsuitable Material

METHOD OF MEASUREMENT:
Measurement for payment for Overexcavation of Geotechnically Unsuitable Material shall be made on the basis of cubic yards of organic peat or silt, loose foundation soils, or other unsuitable material excavated as approved by the Engineer. The depth of unsuitable material in pipe trenches shall be measured from 6 inches below the invert of the pipe to the top of suitable material or specified depth of overexcavation as determined by the Engineer. The width of unsuitable material shall be determined as outlined in the Typical Trench Detail

included with the Contract Documents. The depth of unsuitable material in structure excavations shall be measured from 12 inches below the bottom of the structure slab to the top of suitable material or specified depth of overexcavation as determined by the Engineer. The width of unsuitable material in structure excavations shall be based on a 1:1 slope from the edge of the bottom of the structure to the top of the acceptable material.

BASIS OF PAYMENT / INCLUSIONS:
Overexcavation of Geotechnically Unsuitable Material shall be based on the cubic yards excavated complete for this item in the proposal. Under the unit price bid, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for overexcavation of organic peat or silt, loose foundation soils, or other unsuitable material below the grade of structures, pipe, or manholes, as directed and approved by the Engineer and as may be indicated in the Contract Documents. The work includes, but is not limited to; excavate organic peat or silt, loose foundation soils, or other unsuitable material; transporting material to the temporary soil staging area; furnish and install required temporary excavation support; furnish and place approved geotechnically suitable replacement backfill; compaction and compaction testing; and construction dewatering and all work incidental thereto and all work not specifically included for payment under other items.

EXCLUSIONS/SPECIAL NOTES:
This item does not include payment for the disposal and transportation of soil, other than to temporary staging, as it is paid for under soil management, transportation, and disposal quantities.

END OF SECTION 02210

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SECTION 02252

MANHOLES

2252.1 TYPE-1 MANHOLE – PRECAST 4-FOOT DIAMETER EACH

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Furnishing, installing, and testing of precast concrete sanitary sewer manholes, complete and in place, within the limits and to the lines and grades indicated.

1.2 RELATED TECHNICAL SECTION

A. Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING

B. Section 02590 – BRICK MASONRY

C. Section 03300 – CONCRETE

D. Section 03315 – GROUT

E. Section 07160 – BITUMINOUS DAMPPROOFING

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Complete shop drawings for all precast manhole sections, cast iron frames and covers and appurtenances.

2. Prior to fabrication, submit shop drawings showing details of precast monolithic base sections; risers; eccentric cone and flat slab manhole tops; joints and gaskets; and construction details, tolerances, and other information as required by the Owner.

3. Submit manufacturer’s recommended installation procedures for informational purposes.

4. Submit concrete strength testing as specified herein.

1.4 QUALITY CONTROL

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified.

B. Owner reserves right to inspect and test by independent services at manufacturer's plant or elsewhere at his own expense.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01600 – PRODUCTS, MATERIALS, AND EQUIPMENT.

B. Removed manhole fixtures must not be reused and shall be salvaged and delivered to the City of Somerville Public Works storage yard unless directed by the Owner to dispose off site.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Precast Bases, Risers, and Tops:

1. Except as otherwise indicated, precast reinforced concrete manhole bases and risers shall be 48 inches, 60 inches, 72 inches, or 96 inches, with top sections of types indicated or as directed.

2. Manhole sections shall conform to the requirements of ASTM C478, latest revision, except as modified herein and/or on the drawings.

3. Each manhole section shall be constructed with a bell-and-spigot or tongue-in-groove joint.

4. The manhole sections shall be manufactured by the centrifugal, roller suspension or vertical cast process; workmanship and methods shall be in accordance with the best practices of modern shops for this type of work.

5. The height and diameter of manhole bases shall be as required to accommodate size of pipe used, as approved. The manhole risers shall be available in 1, 2, 3, and 4-foot lengths.

6. Manhole tops of the eccentric cone type shall be 3 or 4 foot lengths, with opening at top matching size of casting nominal diameter, unless otherwise noted as shown in the details.

7. Manholes larger than 4 feet in diameter at the base shall be reduced in diameter to 4 feet at the top riser section unless noted otherwise on the plans.

8. Manhole tops of the flat slab type, where space restrictions exist or where directed, shall not be less than 8 inches thick and reinforced as indicated, and shall have an opening having a minimum inside diameter of 24 inches.

9. Manhole bases and risers shall have the wall thicknesses as stated in the Drawings; cone type units shall taper to a minimum wall thickness of 8-inches at top.

10. Exterior concrete surfaces not otherwise manufactured with crystalline waterproofing admix shall be coated with bituminous damp proofing as per Section 07160 – BITUMINOUS DAMPPROOFING.

B. Concrete:

1. Cement shall be moderate heat-of-hydration Portland cement conforming to ASTM C150, latest revision, Type II. Absorption, determined by absorption test described in ASTM C478, latest revision, shall not exceed 8 percent of dry weight.

2. The concrete for precast manhole sections shall have an average strength of not less than 4,000 psi at 28 days. Strength shall be determined by tests on 6-inch by 12-inch vibrated test cylinders cured in the same manner as the manhole sections, cores cut from the manhole sections, or by other approved methods. Not less than two concrete strength tests shall be made for each 100 linear feet of manhole sections and the test results submitted to the Owner. Testing may be conducted at the manufacturer's plant or at an approved testing laboratory and shall be the responsibility of the Contractor, at no additional expense to the Owner.

C. Frames and Covers:

1. All frames shall have a minimum clear opening of 24 inches. Standard frame height shall be 8-inches high. Compact 4-inch high frames shall be used only where indicated on the drawings or directed by the ENGINEER.

2. Iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow-holes and other defects affecting the strength and value for the service intended. The finished coating shall be tough and tenacious when cold and not brittle or with any tendency to scale off under seasonable temperature changes.

3. Frames and Covers shall be Cast Iron, conforming to ASTM A48, Class 35B and as follows:

a. Castings to be free from scale, lumps, blisters and sandholes.

b. Machine contact surfaces to prevent rocking.

c. Thoroughly clean and conduct hammer inspection.

4. Two pickholes cast 180° apart shall be closed loops to facilitate removing cover allowing manhole pick to “hook” the loops.

5. Manhole frames with 26-inch covers for 24 –inch opening shall be 475 pounds minimum by East Jordan Iron Works 1047Z (frame), 1040A (cover), or approved equal.

6. Frames and covers shall be capable of withstanding AASHTO H-20 loading unless otherwise indicated or specified.

7. The Contractor shall furnish all manhole frames and covers conforming to the details shown on the drawings, or as herein specified. Frames and covers shall be of cast iron with diamond cover surface design. Manhole covers shall be machined to fit securely and evenly on the frame.

8. Covers for all structures shall have the word “SEWER”, “DRAIN” or other appropriate designation cast upon them.

D. Jointing:

1. Precast machine-made solid segments shall conform to ASTM C139.

2. Ends of each length of manhole riser, the bottom end of manhole tops of the cone type, base slabs, and the tops of monolithic bases shall be provided with bell-and-spigot or tongue-and-groove ends of concrete formed on machined rings to insure accurate joint surfaces.

3. Jointing shall be O-ring gaskets or butyl rubber molded sealants. All joints shall be provided so as to be watertight under all conditions of service. The ends of base, riser, and cone sections to be jointed using neoprene "O-ring" type joints shall be designed to enclose the gasket on four surfaces when the joint is in its final position.

E. Gaskets:

1. Gaskets for sealing joints using the "O-ring" type gaskets shall conform to ASTM C443, latest revision, and shall be of rubber of a special composition having a texture to assure a watertight and permanent seal and shall be the product of a manufacturer having at least five years experience in the manufacture of neoprene gaskets for

pipe joints, or shall be vulcanized butyl rubber sealants meeting or exceeding Federal Specifications SS-S-210.

2. Each gasket shall be a continuous ring of round solid cross-section having smooth surfaces free from blisters, porosity and other imperfections. The joint sealing gasket shall be of a composition and texture which shall be resistant to sewage, industrial wastes including gasoline, oils and groundwater, and which will endure permanently under the conditions likely to be imposed by this use. The tensile strength shall be at least 1,200 psi. The elongation shall be such that 2-inch gauge marks shall stretch to not less than 9 inches. The compression set (constant deflection) shall not exceed 25 percent of the original gauge length. The tensile strength after accelerated aging shall be not less than 80 percent of the original strength.

3. The butyl rubber sealant shall have a self-adhesive nature, shall have a diameter of 1 inch, and shall be furnished in coils. The sealant shall meet the following properties:

DESCRIPTION	SEALANT PROPERTY
Base	Vulcanized Butyl Rubber
Percent of Solids	100%
Shore "A" Durometer:	
- Initial	10
- Aged	20
Adhesion to Clean Surfaces	Excellent
Temperature Range:	
- Application	-20° F to 120° F
- Service	-65° F to 200° F
Water Absorption after 14 days immersion:	Less than 5%
Chemical Resistance after 7 days immersion in 5% Potassium Hydroxide and 5% Hydrochloride Acid	Excellent
Resistance to Water and Organic Solvents	Excellent
Resistance to Shock, Heat, and Cold	Excellent
Color	Black
Shelf Life	Excellent
Elongation	
- Initial	30%
- 2 weeks at 190° F, drying	250%
- 2 weeks in water	300%
Weather Resistance	Excellent
Moisture Diffusion Resistance	Excellent
Specific Gravity	1:18
Flash Point	None
Fire Point	Over 620° F

F. Mortar for Sealing Joints:

1. Mortar (grout), for sealing mortar-type joints or grouting field made pipe openings, shall be a non-shrink type mortar or grout which shall be a factory-mixed ready-to-use product containing especially prepared aggregate, cement and sand and other components which will produce a mortar or grout with properties to counteract shrinkage, increase density, withstand impact, improve workability, produce watertight joints, and which will be suitable for jointing around pipes entering manholes.

G. Mortar for Brickwork:

1. Per Section 02590 – BRICK MASONRY

H. Brick

1. Per Section 02590 – BRICK MASONRY

I. Flexible Pipe to Manhole Seals

1. Flexible manhole seals shall be:

   a. New Lok Joint Flexible Sleeve by Interpace,

   b. A-Lok Manhole Sleeve by L & L Concrete Products,

   c. Press Wedge II by Press-Seal Gasket Corporation,

   d. or approved equal.

2. Field applied seals shall be similar to a style typified by Kor-N-Seal boot or an approved equal.

3. Manhole sleeves, gaskets and sealants shall be furnished complete with lubricants, stainless steel stops, inserts, clamps, etc.

PART 3 – EXECUTION

3.1 HANDLING:

A. Manhole sections shall not be shipped for at least five days after manufacture.

B. All manhole sections which have been damaged after delivery, and manhole sections installed in the work which are found to be damaged will be rejected and shall be removed and replaced by the Contractor with new, sound and approved material, at no additional expense to the Owner. At the time of inspection, the surfaces of the sections shall be dense and close-textured. Cores shall serve as a basis for rejection of manhole sections if poor bond or reinforcement is exposed.

C. Each manhole section shall be handled into its position in the trench only in such manner and by such means as recommended by the manufacturer of the manhole sections, and as approved. Provide all necessary slings, straps and other devices for the safe and satisfactory handling and support of the manhole sections during lifting, installation and final positioning of the sections. Lifting holes may be permitted provided suitable rubber or concrete stopper or other approved devices are provided for plugging and sealing the holes and watertight, all as approved.

3.2 INSPECTION

A. All manhole sections will be inspected upon delivery; manhole sections which do not conform to specification requirements will be rejected and shall be removed immediately from the site by the Contractor at no additional cost to the Owner. The Contractor shall furnish all labor and facilities necessary to assist the Owner in inspecting the material.

B. The quality of all materials, processes of manufacture, and the finished manhole sections shall be subject to inspection and approval of the Owner. Such inspection may be made at the place of manufacture and/or on the site, and the manhole sections shall be subject to rejection at any time because of failure to meet any of the specification requirements, even though sample manhole sections may have been accepted as satisfactory.

3.3 INSTALLATION

A. Manhole sections shall be installed level and plumb and set on 12 inches compacted crushed stone or gravel base as indicated on the Drawings.

B. Manhole sections shall be installed using approved type neoprene "O-Ring" type gasket or butyl rubber sealants for sealing joints of manhole sections; jointing shall be performed in accordance with the pipe manufacturer's recommendations, and as approved.

C. Water shall not be permitted to rise over newly made joints until after inspection as to their acceptability. All jointing shall be done in a manner to insure watertight joints.

D. All holes in sections used for handling shall be thoroughly plugged with non-shrink grout.

E. The manhole frames shall be set with tops conforming accurately to the grade of the pavement or finished ground surface or as indicated on the drawings utilizing brick and mortar or reinforced precast concrete rings as per Section 02590 – BRICK MASONRY. Frames shall be set in a full bed of mortar so that the space between the top of the brick and mortar and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the concrete shall be placed all around the bottom flange. The mortar shall be smoothly finished to a height of 4-inches above the flange. Exterior surfaces of brick masonry shall be plastered with 1/2 inch of cement mortar.

E. Opening in precast manhole sections to extent indicated on the drawings to receive entering pipes shall be made at the place of the manufacturer. Where opening cannot be determined, they shall be hole cored in the field. Depending upon the type of pipe seals to be furnished, pipe openings shall be provided with manhole seals of proper sizes to accommodate pipe sizes and shall be cast into the manhole at the time of manufacture. When openings are hole cored in the field, the openings for entering pipes shall be of a size to provide a uniform annular space between the outside of pipe wall and the opening in the manhole section. The annular space for pipes requiring mortar connections (RCP pipe) shall be 3/4 inch, and after the pipe is in position the annular space shall be solidly filled with non-shrink mortar. The annular space for pipes requiring flexible connections (DI, PVC and FRP pipe) shall be made in accordance with the Drawing details. Care shall be taken to

assure that the openings are made to permit setting of the entering pipe at its correct elevation as indicated or directed. Openings which are hole cored in the manhole sections in the field shall be circular, not square and shall be made by the appropriate coring operation; damaged sections will be rejected and shall be replaced at no additional expense to the Owner.

F. Manhole inverts shall be brick masonry or concrete and shall have a cross-section shaped to conform to connecting pipes; changes in size shall be made gradually and evenly. Concrete and brick masonry for manhole inverts shall conform to Section 03300 – CONCRETE and Section 02590 – BRICK MASONRY, constructed as indicated and as specified.

3.4 BACKFILLING

A. Conduct backfill operations of open cut trenches closely following laying, jointing, and bedding of pipe, and after initial inspection and testing are completed, all in accordance with Section 02210 – EARTH EXCAVATION, BACKFILL, FILL, AND GRADING.

3.5 INSPECTION AND TESTING

A. Acceptance of precast reinforced concrete manhole sections will be made on the basis of plant tests, material tests, and inspection of the completed product, in accordance with the requirements of ASTM C478, latest revision, with the following modifications.

B. Manhole sections shall not be shipped for at least five days after manufacture when cured by subjecting them to thoroughly saturated steam at a temperature between 100 and 150° F for a period of not less than 8 hours, or when necessary, for such additional time as may be required to enable the manhole sections to meet specification requirements.

C. Leakage Tests

1. Leakage tests for four (4) foot and five (5) foot diameter manholes may be made using vacuum testing equipment. This type of test may be used only immediately after assembly of the manhole and only prior to backfilling. The manhole to pipe connection should only be a flexible connector. All lift holes shall be plugged with a non-shrinking mortar. For this test, each four or five foot diameter manhole shall be tested under 10-inch of Hg vacuum. The test shall pass if the vacuum remains at 10-inch Hg or drops no lower than 9-inch Hg after 60 seconds for manholes 0 to 10 feet deep, 75 seconds for manholes 10 to 15 feet deep or 90 seconds for manholes 15 to 25 feet deep.

3.6 CLEANING

A. All excess material including dirt, loose concrete, bricks, grit, stones and any

other material, shall be removed from all manholes prior to final review by the Engineer. A final cleaning shall be performed, to include complete removal of all accumulated debris and fluids from each catch basin, upon complete project completion.

PART 4 – COMPENSATION

Item 2252.1 --- Type-1 Manhole – Precast 4-foot Diameter

BASIS OF PAYMENT/INCLUSIONS:
Under the Unit Price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for the complete procurement, installation, cleaning, and leakage testing/inspection of 4-foot diameter precast concrete manholes complete as indicated on the Drawings and Specifications, or as directed by the Owner or Engineer. This work shall include furnishing, installing, and/or performing the following: pavement or sidewalk sawcutting; removal of brick, concrete, or bituminous sidewalk; excavation of bituminous concrete roadway; excavation; transporting material to/from soil staging area; temporary excavation support consisting of timber or steel sheeting, left in place and cut off below grade where required by the Contract Specifications; sanitary sewer and storm drain flow handling; removal of groundwater from the trench; handling groundwater recharged back to the soil; filter fabric as required; bedding, including compaction; precast manhole sections with frames, covers, masonry chimney, appurtenances, bench and masonry invert construction, and sanitary sewer (if applicable) pipe sleeve (if applicable); bituminous damp proofing (if applicable); furnishing, placing and compacting suitable backfill soil; grade and compact gravel pavement sub-base; compaction testing; and all appurtenances and incidental work.

METHOD OF MEASUREMENT:
Payment for Manhole – Precast 4-foot Diameter shall be based on the Unit Price bid in the proposal. Measurement for payment shall be based on the actual number of complete and functional manholes as shown on the Contract Drawings or as directed by the Owner or Engineer.

Manholes installed but not successfully tested and accepted shall be paid for at a maximum of 95 percent of the unit prices bid under this item. The remaining 5 percent shall be paid upon receipt of successful test results by the Engineer. All reductions in payment due to unsuccessful testing shall be made prior to normal retainage.

SPECIAL NOTES ON EXCLUSIONS:
The following item(s) are not included for payment under this item and are included for payment elsewhere: manholes of different diameters; manholes of different types; disposal of bituminous concrete and construction debris; treatment of groundwater discharged under the DEP Dewatering Permit; procurement, installation, and compaction of CDF.

-END OF SECTION 02252-

SECTION 02500

PAVING AND SURFACING

2500.1 HOT MIX ASPHALT BASE COURSE –TRENCH WIDTH (PERMANENT TRENCH PATCH) TON

PART 1 – GENERAL

1.1 DESCRIPTION

A. Furnish and install paving on all roadway areas as indicated and specified.

B. Pavement and surfacing shall be constructed in courses as shown on the plans and as required in accordance with these specifications and in close conformity with the lines, grades, compacted thickness and cross sections shown on the plans.

C. The Contractor shall take all reasonable measures to assure proper drainage on the final surface of the roadway. Pavement that does not drain properly due to poor workmanship shall not be accepted by the Owner and shall be replaced by the Contractor at no additional cost to the Owner.

D. Reference is made herein to the Commonwealth of Massachusetts Department of Transportation, Standard Specifications for Highways and Bridges, latest edition, and all addendums/supplemental specs hereinafter referred to as the "Standard Specifications." All references to method of measurement, basis of payment, and payment items in the Standard Specifications are hereby deleted. References made to particular sections or paragraphs in the Standard Specifications shall include all related articles mentioned therein.

1.2 RELATED WORK

A. Division 1 – General Requirements

B. Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING

C. Section 03300 – CONCRETE

1.3 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with the General Conditions of Contract and Section 01300 – SUBMITTALS:

1. Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

2. Design Data: Submit design mix for asphalt base, binder and top course.

1.4 GRADE CONTROL

A. Establish and maintain required lines and elevations.

1.5 QUALITY CONTROL

A. The Engineer may require the Contractor to remove at their own expense, any defective mix not conforming to the specified job mix formula within the stipulated tolerances. Samples of the actual mixture in use will be taken as many times daily as necessary and the mixtures shall be maintained uniform for the project. The Engineer may suspend further approval for use of the Plant mixtures if the mixtures do not conform to the specified requirements.

B. Do not place materials when underlying surface is muddy, frozen, or has frost, snow, or water thereon.

1.6 GUARANTEE

A. During the one-year guarantee period, the Contractor shall maintain the surfacing and shall promptly fill with similar material in compliance with the Specifications, any depressions and holes that may occur during that time period.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Gravel Subbase

1. Materials including preparation of subgrades shall meet the requirements of the applicable sections of the Specifications.

2. The trench gravel subbase shall be used in the upper 1-foot of trench backfill material immediately below pavements and graded in accordance with Massachusetts Highway Department "Standard Specifications" Section M1.03.1 and applicable subsections of Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND

GRADING.

B. Hot Mix Asphalt Pavement – Base Course

1. Asphalt Base Course and Asphalt Tack Coat shall conform to the applicable subsections of Section 460, Hot Mix Asphalt Pavement, of the Massachusetts Highway Department's "Standard Specifications".

2. Tack coat shall be RS-1 emulsion.

C. Hot Mix Asphalt Pavement – Binder Course

1. Asphalt Binder Course shall conform to the applicable subsections of Section 460, Hot Mix Asphalt Pavement, of the Massachusetts Highway Department's "Standard Specifications."

D. Hot Mix Asphalt Pavement – Top Course

1. Asphalt Top Course shall conform to the applicable subsections of Section 460, Hot Mix Asphalt Pavement, of the Massachusetts Highway Department's "Standard Specifications."

D. Hot Poured Rubberized Asphalt Sealer

1. Hot Poured Rubberized Asphalt shall conform to Federal Specification Number SS-S-1401 as required in Section 460, Hot Mix Asphalt Pavement, of the Massachusetts Highway Department's "Standard Specifications."

PART 3 – EXECUTION

3.1 SUBGRADE PREPARATION AND PROTECTION

A. Bring subgrade to required grade as necessary prior to placing subbase material.

B. As required by the Engineer, over-excavate on-site fill material and any unacceptable materials below the subgrade. Utilize excavating equipment equipped with a toothless or smooth edged, excavating bucket to expose the on-site fill material and unacceptable materials to avoid disturbance of the bearing surface.

C. Proof roll the overexcavated subgrade prior to placing crushed stone.

D. Backfill the overexcavation with crushed stone and compact as indicated in Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND

GRADING.

3.2 PLACEMENT OF SUBBASE

A. Do not begin placement of subbase and paving work until deficient subgrade areas have been corrected and are ready to receive paving.

B. Subbase under roadway shall be installed and compacted as covered in the Contract Drawings and in Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

3.3 HOT MIX ASPHALT BASE COURSE

A. Weather Limitations

1. Apply prime and tack coats when ambient temperature is above 50 deg.F (10 deg.C), and when temperature has not been below 35 deg.F (1 deg.C) for 12 hours immediately prior to application. Do not apply when subbase is wet or contains an excess of moisture.

2. Base course pavement for temporary pavement may be placed when air temperature is above 30 deg.F (-1 deg.C) and rising.

B. Placement

1. Base course shall be spread and compacted to a finished thickness indicated on the Contract Drawings. A smooth even surface shall be produced.

2. Base course placement for temporary paving and trench paving shall be performed on a weekly basis or as otherwise approved by the Owner and Engineer. Cold Patch for temporary pavement shall not be allowed with the exception of in an emergency or to cover steel road plate edges.

3. Base course placed as temporary paving shall be maintained until removed prior to final paving.

3.4 HOT MIX ASPHALT TOP COURSE

A. Weather Limitations

1. Construct asphalt surface course when atmospheric temperature is above 40 deg.F (4 deg.C) and when base is dry.

B. Settlement Period

1. After a 90-day minimum period, or a winter settlement period, a 2-inch permanent pavement top course shall be installed in accordance with the requirements of the trench paving detail provided in the drawings.

B. Placement

1. Top course shall be spread and compacted, to the width required in the Contract Documents and to a finished thickness indicated in the Contract Documents. A smooth, even surface shall be produced. Overlays shall be installed after the street has been cold planed or as approved by the Owner and Engineer.

2. Apply tack coat at a rate of 0.05 to 0.10 gallons per square yard over the base and binder courses. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile.

C. Placing Mix

1. Place hot mix asphalt mixture on prepared surface, spread and strike-off. Spread mixture at minimum temperature of 225 deg.F (107 deg.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.

2. Place pavement in strips not less than 2-feet wide, unless otherwise acceptable to Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete binder course for a section before placing top course.

3. The Contractor shall supply an approved Dial Type Asphalt Thermometer (Range 10º C to 260º C) for each paving machine in operation on the project. The thermometer shall remain the property of the Contractor upon completion of the project.

D. Rolling

1. Begin rolling when mixture will bear roller weight without excessive displacement. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

2. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check

surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.

3. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

4. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

5. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas and fill with fresh, hot mix asphalt. Compact by rolling to match the surrounding surface density and smoothness.

6. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked by wheel traffic.

E. Existing Pavement/Joints

1. The edges of existing pavement, which are to remain, shall be saw cut to even, straight edges. This includes road and trench edges. Any joints at junction of old and new pavements shall be sealed with an asphalt emulsion and covered with sand.

2. Make joints between old 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 sections of asphalt course. Clean contact surfaces and apply tack coat.

F. Compaction

1. The asphalt mixture shall be compacted to at least 95% of the density achieved on the laboratory testing of the design mix for the project. Density will be checked by the Nuclear Density Gage Method, ASTM D2950. Testing shall be completed by Contractor at no expense to Owner for every 200 square yards of surface area placed.

G. Field Quality Control

1. Thickness: Test in-place asphalt courses for compliance with requirements for thickness. Repair or remove and replace

unacceptable paving as required by Engineer, and at no additional cost to the Owner. In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:

a. Base or Binder Course: 1/4-inch, plus or minus.

b. Surface Course: 1/4-inch, plus or minus.

H. Crack Sealing

1. Crack sealing shall be performed where required by the Engineer with modified asphalts (e.g. hot poured rubberized asphalt sealer). Prior to sealing a crack all compressible material shall be removed by high-pressure air or routing. If grass or vegetation is present in the crack the Contractor shall inject a liquid herbicide to prevent future growth. For small hairline cracks, an asphalt slurry mixture type SS-1, SS-1h shall be squeegeed over the surface and forced in the cracks. The slurry shall be maintained at a significant fluidity to be able to flow into the hairline cracks. Sealing of cracks shall be considered to be complete upon review and approval by the Engineer.

I. Liquid Asphalt Emulsion

1. Liquid Asphalt Emulsion shall be applied prior to installation of asphalt as incidental to all pavement pay items. Emulsion shall be AC-20 conforming to AASHTO M226 and shall be applied at a temperature over 100 degrees F by an emulsion truck.

2. The emulsion truck shall have pneumatic tires of such width and number that the load produced on the surface shall not exceed 672 lbs/in of tire width, and it shall be designed, equipped, and operated so that at an even heat the emulsion may be applied uniformly on variable widths of surface at a readily controlled rate of 1/20 gal/square yard or as required by the Engineer.

3. The emulsion shall be applied within a pressure range of 25 psi to 75 psi. Distributor equipment shall include a tachometer, pressure gauges, volume-measuring devices, and a thermometer for reading the temperature of tank contents. The distributor shall be self-powered and shall be equipped with a power unit for the pump and full circulation spray bars adjustable laterally and vertically.

3.5 RAISING AND ADJUSTING CASTINGS

A. Prior to top course paving, all existing City or Owner owned catch basin and

manhole castings and curb and valve boxes shall be raised, if necessary, to the proper grade by the Contractor.

B. Castings owned by private utilities shall be raised by the responsible utility. The Contractor shall be responsible for coordinating this work.

C. The method of adjusting catch basin and manhole castings shall be as follows: Cut around catch basin or manhole castings a minimum of 8 inches from casting. Excavate and, if required, rebuild up to 12 inches of masonry below the bottom of the casting. Backfill with suitable material and compact to bottom of casting. Place high, early strength cement concrete or hot mix asphalt collar, as required by the Authority, to approximately 1½ inches below the raised casting grade. Masonry work shall conform to Section 02252 - MANHOLES and Section 02590 – BRICK MASONRY.

D. The method of raising curb and valve boxes shall be as follows: Cut around valve box a minimum of 8 inches from valve box. Excavate as required and raise the valve box. Pour high early strength cement concrete or hot mix asphalt collar, as required, to approximately 1½ inches below the top of the valve box.

PART 4 – COMPENSATION

Item 2500.1 --- Hot Mix Asphalt - Trench Width (Permanent Trench Patch)

METHOD OF MEASUREMENT:
Measurement for Payment for Hot mix asphalt Base Course – Trench Width shall be based on the tons of base course placed complete, to a maximum width defined by the payment limits shown on the Contract Drawings or as required by the Engineer and as measured by the Engineer. Tonnage of pavement placed will be verified through calculation based on the actual thickness and trench widths and lengths or the pavement thicknesses, widths, and lengths defined in the Contract, whichever is less. The formula for calculating the tonnage of pavement shall be W' (trench width) x L' (trench length) x D' (trench depth) x 0.075 ton/cf = tons. Calculated tonnage will be compared to the actual tonnage placed as submitted on pavement tonnage slips. If the tonnage calculated is greater than 10% lower than the tonnage on the pavement slips, the lesser tonnage shall be paid to the Contractor. Placement of pavement to excess thicknesses and outside the limits defined in the Contract Documents shall be at no additional cost to the Owner.

BASIS OF PAYMENT:
Payment for Hot mix asphalt Base Course – Trench Width shall be based on the unit price bid for this item in the proposal. Under the unit price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to install hot mix asphalt base course and top course within the limits of the trenches to depth and width indicated within the payment limits, complete, as shown in the Contract Documents or at the requirements of the Engineer. The work includes, but is not limited to the following; raising and resetting existing structures, castings and boxes; installation and compaction of hot mix asphalt base

course and top course to the depth and width and in the area specified; milling of base course material after the settlement period; hand placement and compaction of hot mix asphalt around structures, aprons, driveways and as required; power sweeping; keyways and other jointing between new and existing asphalt; furnish and place tack coat on all edges; and all incidental work not included for payment elsewhere.

SPECIAL NOTES ON EXCLUSIONS:
Items not included for payment herein include, but are not limited to: pavement installed to replace asphalt damaged by the Contractor.

END OF SECTION 02500

SECTION 02590

BRICK MASONRY

PART 1 – GENERAL

1.1 DESCRIPTION

A. The work covered under this Section includes the furnishing of all plant, labor, equipment, appliances and materials, and in performing all operations in connection with providing brick masonry, as directed, for furnishing and installing masonry plugs, brick inverts and tables, raising and adjusting castings, and for all other necessary appurtenant work complete and accepted in accordance with the Drawings and Specifications and as directed.

1.2 RELATED TECHNICAL SECTIONS

A. Section 02051 – DEMOLITION, MODIFICATION, AND ABANDONMENT

B. Section 02252 – MANHOLES

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Submit manufacturer specification sheets for and shop drawings for all masonry items, mortar and appurtenances.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Masonry

1. Masonry shall include brick masonry for extending manhole and catch basin frames to grade, brick masonry plugs for pipes and structures, manhole invert tables, cement mortar plaster on interior and exterior surfaces of masonry walls, mortar and related work. Brick masonry plugs for pipes and structures shall be a minimum of 8-inches thick, unless otherwise shown or directed. Other brick masonry shall be provided to the details and the dimensions specified, indicated or as directed.

B. Bricks

1. Bricks in general shall be clay or shale brick and shall conform in all

respects to ASTM C32, latest revision, Grade SS. Bricks that are broken, warped, cracked or of improper size or quality, or otherwise defective shall not be used in the work and shall be removed from the site.

2. Brick for extending manhole frames to grade shall be concrete brick conforming to ASTM C139, latest revision.

C. Cement

1. Cement shall conform to the standard specifications for Portland cement of ASTM C150, latest revision, Type II, unless otherwise directed. Whenever directed by the Owner, a quick-setting cement (Type III) shall be used for any desired purpose at no additional expense to the Owner.

D. Sand

1. Sand for mortar shall be graded uniformly from fine to coarse and when dry shall pass a No. 8 sieve. Sand shall consist of aggregate having clean, hard, durable, strong, uncoated grains and free from injurious amounts of dust, lumps, soft or flaky particles, shale, alkali, organic matter, loam or other deleterious substances. The sand shall be washed clean before loading on delivery trucks. Natural sand which shows a color darker than the standard color when tested in accordance with the Colorimetric Test for Sands as described in ASTM C40, latest revision, will be cause for rejection.

E. Lime

1. Lime shall be hydrated lime conforming to ASTM C207, latest revision.

F. Water

1. Mixing water for concrete and mortar shall be clean and free from oil, acid, alkali, injurious amounts of vegetable matter and other impurities. Potable water obtained from a municipal supply is preferable.

G. Mortar

1. Mortar and mortar plaster shall be composed of one part Type II portland cement, and two parts sand to which a small amount of hydrated lime, not to exceed 10 lbs. to each bag of cement, shall be added. Only a sufficient amount of water shall be added to make a stiff plastic mortar of a consistency and texture satisfactory to the Owner. Retempering of mortar in which the cement has started to set

will not be permitted.

PART 3 – EXECUTION

3.1 GENERAL

A. All exterior surfaces of masonry walls shall be plastered with mortar plaster to provide a minimum thickness of 1/2 inch. Mortar plaster shall be applied with sufficient pressure to insure a dense plaster completely filling all voids and thoroughly bonded to the masonry wall. Masonry construction shall be done in a manner to insure watertight construction and all leaks in masonry shall be sealed.

B. All workmanship shall conform to the best standard practice, and all brick masonry shall be laid by skilled workmen. Brick masonry for extending frames to grade shall be constructed to the thickness indicated. Brick masonry walls shall be constructed to the thickness indicated. All beds on which masonry is to be laid shall be cleaned and wetted properly. Brick shall be wetted as required and shall be damp but free of any surface water when placed in the work. Bed joints shall be formed of a thick layer of mortar which shall be smoothed or furrowed slightly. Head joints shall be formed by applying to the brick to be laid a full coat of mortar on the entire end, or on the entire sides as the case requires, and then shoving the mortar-covered end or side of the brick tightly against the bricks laid previously; the practice of buttering at the corners of the brick and then throwing mortar or scrapings into the empty joints will not be permitted. Dry or butt joints will not be permitted. Joints shall be uniform in thickness and shall be approximately 3/8-inch thick. Joints on the inside face of walls shall be tooled slightly concave with an approved jointer when the mortar is thumbprint hard; the mortar shall be compressed with complete contact along the edges so as to seal the surface of the joints. Brickwork shall be constructed accurately to dimensions, and brickwork at top of manholes shall be to the dimensions of the flange of the cast iron frames.

C. No water shall be allowed to flow against brickwork or to rise on the masonry for 60 hours after it has been laid, and any brick masonry damaged in this manner shall be replaced as directed at no additional expense to the Owner. Adequate precautions shall be taken in freezing weather to protect the masonry from damage by frost. Plaster shall be troweled to a smooth hard finish and no backfill shall be placed until the mortar has thoroughly hardened.

PART 4 – COMPENSATION

-Not Used-

-END OF SECTION 02590-

SECTION 02622

POLYVINYL CHLORIDE PIPE

2622.1 PIPE – PVC (GRAVITY) 24-INCH LINEAR FOOT

2622.2 RECONNECT, REPAIR, OR RELOCATE EXISTING SANITARY SEWER LATERALS LINEAR FOOT

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes the following:

1. Furnishing, installing, and testing of PVC pipe and fittings complete and in place, within the limits and to the lines and grades indicated.

1.2 RELATED TECHNICAL SECTIONS

A. Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING

B. Section 02252 – MANHOLES

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Shop drawings of pipe and fittings,

2. Product data and certified dimensional drawings of all pipe, joints, bends, special fittings, and appurtenances.

3. Gasket and pipe manufacturer's joint assembly directions,

4. Certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, as specified in the referenced standards,

5. For informational purposes only, submit manufacturer's printed installation instructions.

6. Certification with each delivery, that pipe complies with this specification,

7. Anticipated production and delivery schedule.

8. Results of leakage tests performed prior to final paving.

a. Test results shall be logs maintained during Infiltration or Exfiltration Tests, or footage and logs of Close Circuit Television Inspection.

1.4 QUALITY CONTROL

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified.

B. Owner reserves right to inspect and test by independent services at manufacturer's plant or elsewhere at his own expense.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01600 – PRODUCTS, MATERIALS, AND EQUIPMENT.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General

1. All PVC pipe shall be continuously and permanently marked with the manufacturer's name, pipe size, and pressure rating or stiffness in psi (kpa).

2. The Contractor shall also require the manufacturer to mark the date of extrusion on the pipe. This dating shall be done in conjunction with records to be held by the manufacturer for 2 years, covering quality control tests, raw material batch number, and other information deemed necessary by the manufacturer.

B. Pipe

1. All PVC pipe shall be joined by compression joints unless otherwise shown or specified, and shall conform to the following requirements:

2. Non Perforated Polyvinyl chloride pipe (PVC) shall conform to the requirements of ASTM D 3034, Class SDR 35. Material for PVC pipe shall conform to the requirements of ASTM D 1784 for Class 12454-B or 12454-C as defined therein. All diameters shall be as specified on the Contract Drawings.

4. Elastomeric seals for compression type joints for PVC pipe and fittings shall conform to the requirements of ASTM D 3212.

5. Service pipes for sanitary services shall be minimum of 6 inches and shall match diameter of existing, services for reconnections.

C. Fittings

1. All fittings shall conform to the requirements of ASTM D 3034 or ASTM F 679. The ring groove and gasket ring shall be compatible with PVC pipe ends. The flanged fittings shall be compatible with cast-iron or ductile iron pipe fittings.

2. The strength class of the fittings shall be not less than the strength class of any adjoining pipe.

3. PVC pipe fittings shall be full-bodied, either injection molded or factory fabricated. Saddle-type tee or wye fittings are acceptable in accordance with Figure 02622 A and Figure 02622 B. Inserta-tees may be used only where approved by the Engineer and if allowed, shall be cast in 6-inches of concrete.

D. Shielded Flexible Couplings

1. General

a. Shielded flexible couplings shall be used to connect to sewer pipe. Typical applications are where new pipe connects to existing pipe or a pipe with dissimilar material or size.

b. Non-shielded flexible couplings are permitted for sewer and drain service laterals 6-inch in diameter or less.

c. Couplings and shields shall be sized to fit the outer diameter of pipe, and be rated for the pipe material and conditions of service by the manufacturer.

d. Eccentric couplings shall be used where connecting pipes of different nominal diameter.

e. The CONTRACTOR will not be allowed to substitute any other type of coupling unless approved by the ENGINEER.

2. Construction

a. Flexible couplings shall be in accordance with ASTM C1173 – Standard Specification for Flexible Transition Couplings for Underground Piping Systems.

b. Rubber sleeves shall be rated for heavy earth loads and be immune to attack by chemicals and impurities normally found in water or wastewater.

c. Shields shall consist of a rigid stainless steel shear ring.

d. Bolts, nuts, straps, and all miscellaneous hardware shall be Type 316 stainless steel.

3. Manufacturer

a. Shielded flexible couplings shall be Fernco (5000 Repair series), Mission Rubber (Flex-Seal Repair series), Indiana Seal (Heavy Duty Repair series) or approved equal.

b. Non-shielded flexible couplings shall be Fernco (Stock and Eccentric series), Mission Rubber (Flex Seal Stock series), Indiana Seal (Stock series) or approved equal.

E. Service Connections

1. Sanitary services shall be connected to new, parallel, replacement or existing sanitary sewer lines with full bodied tees, wye fittings, or saddle-type tees in accordance with the following:

a. For 6-inch dia. sanitary services to sanitary sewer mainlines a saddle type (Romac Style CB or equal) or full bodied fitting with solid transition coupling shall be used;

b. For 8-inch dia. sanitary services to existing 12-inch dia or less sanitary sewer mainlines a full bodied fitting with solid transition coupling shall be used;

c. For 8-inch dia. sanitary services to new 15-inch dia or less sanitary sewer mainlines a full bodied fitting with solid transition coupling shall be used;

d. For 10-inch dia. sanitary services consult with engineer; and

e. Otherwise reference Figure 02622 A.

Figure 02622 A

Service Connection On New Mainline Pipes

	Dia. of Mainline Pipe						
	8"	10"	12"	15"	18"	21"	24"
Service Dia.	New Sanitary Sewer						
6"*	FB/S	FB/S	FB/S	FB/S	FB/S	FB/S	FB/S
8"	FB	FB	FB	FB	FB/S	FB/S	FB/S
10"	C	C	C	C	C	C	C
	New Storm Drain						
6"*	FB/S	FB/S	FB/S	FB/S	S	S	S
8-10"	C	FB / C	FB / C	FB / C	FB / C	FB/ C	FB/ C
12"	C	C	FB / C	FB / C	FB / C	FB / C	FB/C

Note: In every situation a full body fitting is acceptable
* Minimum allowable service diameter
C: consult engineer
FB: full bodied fitting required
S: saddle

F. Bedding Materials

1. Unless otherwise specified or shown, all material used for pipe bedding shall conform to the requirements in Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

G. Gaskets

1. Gaskets shall be flexible elastomeric rings conforming with ASTM F 477.

PART 3 – EXECUTION

3.1 PIPE AND PIPE FITTINGS

A. Each pipe unit shall be inspected before being installed. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16-inch per foot of length. If a piece of pipe fails to meet this requirement for straightness, it shall be rejected and removed from the site. Any pipe unit or fitting discovered to be

defective either before or after installation shall be removed and replaced with a sound unit.

B. All premolded gasket joint polyvinyl chloride pipe of a particular manufacturer may be rejected if there are more than five unsatisfactory joint assembly operations or "bell breaks" in 100 consecutive joints, even though the pipe and joint conform to the appropriate ASTM Specifications as hereinbefore specified. If the pipe is unsatisfactory, as determined above, the Contractor shall, if required, remove all pipe of that manufacturer of the same shipment from the work and shall furnish pipe from another manufacturer which will conform to all of the requirements of these specifications.

3.2 INSTALLATION

A. Install PVC pipe and fittings in accordance with manufacturer's printed instructions.

B. No pipe or fitting shall be permanently supported on saddles, blocking, or stones. Bedding material shall be as specified in Section 02210 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

C. Suitable bell holes shall be provided, so that after placement, only the barrel of the pipe receives bearing pressure from the supporting material. Special care shall be taken to hold the trench width at the crown of the pipe to the maximum indicated on the Trench Detail included in the Details Section of these Specifications.

D. Before any joint is made, the previously installed unit shall be checked to assure that a close joint with the adjoining unit has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to the required grade by striking it with a shovel handle, timber or other unyielding object.

E. Contractor shall verify line and grade of sewers using a laser level, or other means of equivalent accuracy during installation and before proceeding to the next section.

F. All joint surfaces shall be cleaned. Immediately before jointing the pipe, the bell or groove shall be checked to see that the rubber ring is properly seated. Apply lubricant to the spigot end only, paying particular attention to the bevel, in accordance with the manufacturer's recommendation. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. Suitable devices shall be used to force the pipe units together so that they will fit with minimum open recess inside and outside and have tightly sealed joints. Care shall be taken not to use such force as to wedge apart and split the bell or groove ends. Joints shall not be "pulled" or "cramped" unless permitted by the Engineer. The resulting joints shall be watertight and flexible.

G. Where any two pipe units do not fit each other closely enough to enable them to be properly jointed, they shall be removed and replaced with suitable units and new gaskets.

H. Allowable Pipe Deflection

1. Pipe provided under this Specification shall be so installed as to not exceed a maximum deflection of 5.0 percent. Such 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. Upon completion of a section of pipe, including placement and compaction of backfill, the Contractor shall measure the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer, and be reviewed by the Engineer. The section of pipe must be placed and backfilled for a minimum of 90 days before the deflection can be measured. Deflection shall be measured before final paving.

3. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem without additional compensation.

I. Open ends of pipe and branches shall be closed with polyvinyl chloride stoppers secured in place in an acceptable manner.

J. After each pipe has been properly bedded, enough bedding material shall be placed between the pipe and the sides of the trench, and thoroughly compacted, to hold the pipe in correct alignment. Bell holes, provided for jointing, shall be filled with bedding material and compacted, and additional material shall be placed and compacted to complete the pipe bedding.

K. The Contractor shall take all necessary precautions to prevent flotation of the pipe in the trench. At all times pipe installation is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs, or by other acceptable means.

1. If water is in the trench when work is to be resumed, the plug shall not be removed until suitable provisions have been made to prevent water, earth, or other substances from entering the pipe. Pipelines shall not be used as conductors for trench drainage during construction.

L. For installation near crossing utilities and encasement requirements, refer to Contract Drawings.

M. For lateral service connections and encasement requirements, refer to Contract Drawings.

N. Cleaning

1. Care shall be taken to prevent earth, water and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out the pipeline and manholes being careful to prevent soil, water and debris from entering any existing pipe.

O. Shielded Flexible Couplings

1. Where couplings are used, plain ends of pipe shall be made smooth and round for a distance of 12 inches from the ends of the pipe, with an outside diameter not more than 1/64 inch smaller than the manufactured outside diameter of pipe. Install couplings per manufacturer's written instructions.

2. SPARE PARTS - CONTRACTOR shall maintain an on-site inventory of couplings suitable for use with the various nominal diameters and materials of proposed and existing pipe referenced in the CONTRACT DOCUMENTS. CONTRACTOR shall be responsible to verify the outer diameter of pipe in advance through measurements taken at access manholes and test pits. The lead times for fabrication, stocking and shipping of couplings shall not be cause for delay or the use of other types of couplings.

3.3. LEAKAGE TESTS

A. Sewers shall be made as nearly watertight as practicable. Where practical, as determined by the Owner, leakage tests will be performed for the new sewers.

B. Testing of sewers will be limited, as determined by the Owner, to physical inspection of the pipe sections by closed circuit television inspection. Any defective pipe, joints, or other construction shall be replaced or repaired by the Contractor at no additional expense to the Owner.

B. The contractor shall perform CCTV inspection of the sewer at no additional cost to the Owner. The Engineer must be able to witness the tests and must be provided with a video recording of each test for further inspection.

PART 4 – COMPENSATION

Polyvinyl Chloride Pipe

Item 2622.1 --- Pipe – PVC (Gravity) 24-Inch

Item 2622.2 --- Reconnect, Repair, or Relocate Existing Sanitary Sewer Laterals

BASIS OF PAYMENT/INCLUSIONS:
Under the Unit Price bid for item 2622.1 through 2622.2, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for the complete procurement, installation, cleaning, and leakage testing/inspection of polyvinyl chloride pipe complete as indicated on the Drawings and Specifications, or as directed by the Owner or Engineer. This work shall include furnishing, installing, and/or performing the following: pavement or sidewalk sawcutting; removal of brick, concrete, or bituminous sidewalk; excavation of bituminous concrete roadway; excavation; transporting material to/from soil staging area; temporary excavation support consisting of timber or steel sheeting, left in place and cut off below grade where required by the Contract Specifications; sanitary sewer flow handling; removal of groundwater from the trench; handling groundwater recharged back to the soil; filter fabric as required; bedding, including compaction; polyvinyl chloride pipe, fittings, couplings, and appurtenances; connecting existing laterals; connections to structures; cleanout assemblies (if required); placing and compacting suitable backfill soil; grade and compact gravel pavement sub-base; compaction testing; and all appurtenances and incidental work.

METHOD OF MEASUREMENT:
Payment for Polyvinyl Chloride Pipe shall be based on the Unit Price bid in the proposal.

Measurement for payment of items 2622.1 through 2622.2 shall be based on the actual linear feet of complete and functional pipes as shown on the Contract Drawings or as directed by the Owner or Engineer. Measurement shall be taken along the centerline of the pipe from the inside face of structures to inside face of structures, or to the points of connection with existing pipes.

Pipe installed but not successfully tested and accepted shall be paid for at a maximum of 95 percent of the unit prices bid under this item. The remaining 5 percent shall be paid upon receipt of successful test results by the Engineer. All reductions in payment due to unsuccessful testing shall be made prior to normal retainage.

SPECIAL NOTES ON EXCLUSIONS:
The following item(s) are not included for payment under this item and are included for payment elsewhere: disposal of bituminous concrete and construction debris; treatment of groundwater discharged required by an MWRA Dewatering Permit; procurement, installation, and compaction of CDF.

END OF SECTION 02622

SECTION 02760

PIPELINE CLEANING AND INTERNAL INSPECTION

2760.1	**CLEANING OF SANITARY SEWERS AND STORM DRAINS**	**LUMP SUM**
2760.2	**CLOSED CIRCUIT TELEVISION INSPECTION**	**LUMP SUM**

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes the following:

1. Furnishing, and performing gravity-flow infrastructure cleaning and inspection work for pipe diameters ranges of 6-in to 48-in in accordance with these Specifications.

2. Work shall include cleaning and videotaping of existing, reconstructed, rehabilitated, or new sewers and drains, as well as flow handling and/or bypass pumping of existing flows as needed to perform the cleaning and inspection.

3. Requirements for the testing of removed sediment and its proper disposal.

1.2 RELATED TECHNICAL SECTIONS

A. Section 01500 – TEMPORARY FACILITIES AND CONTROLS

B. Section 02080 – SOIL AND WASTE MANAGEMENT

C. Section 02095 – TRANSPORTATION AND DISPOSAL OF SOIL AND FILL.

D. Section 02761 – FLOW BYPASS

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Sewer and Storm Drain Cleaning Plan at least two weeks prior to the start of any cleaning, in which shall include:

a. Proposed method of pipe cleaning and dewatering including the equipment to be used and OSHA-compliant confined space entry procedures.

b. Proposed method of managing wastewater, erosion controls, solid waste management, and which, if any, additional permits are required,

c. A list of lawful disposal sites proposed for dumping debris from cleaning operations.

2. Work Plan including: hours of operation, location of proposed access manholes, sequencing of work description, number of shifts, number of crews, and expected time to complete the work.

3. Vehicular and Pedestrian Management Plan including: access, avoiding damage to existing trees, preventing leakage from hoses, and minimizing noise from pumps.

4. Internal Inspection Report including:

a. Pre-rehabilitation or pre-cleaning internal inspection logs and video (if required),

b. Post-construction, post-rehabilitation, or post-cleaning internal inspections logs and video,

c. Summary highlighting results of the investigations. All documentation shall be cross-referenced by footage meter device to enable the reviewer to identify a particular location being viewed.

1. These records shall be in printed form showing: the Owner's name; type of project; Contractor's name; date; manhole location; depth to invert; section cleaned and televised; the number of lateral connections to the section televised; type (e.g. sanitary sewer, combined sewer, or storm drain); street address and type of all laterals connected to storm drain; diameter of pipe; length of section; exact location(s) of pipeline defects; type of equipment used; and any special remarks concerning the conditions of the pipe line, manholes, and separation plates.

5. A sample DVD showing the quality of work obtained by the proposed assembly prior to internal inspection work. The quality of work shall be acceptable to the Engineer.

1.4 QUALITY CONTROL

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified.

B. The cleaning and inspection of the infrastructure may require manned entry in the sewer or drain to place or remove equipment, or to facilitate manual

cleaning of the pipeline. All confined space entry procedures must be in compliance with OSHA regulations.

PART 2 – MATERIALS (Not Used)

PART 3 – EXECUTION

3.1 PIPE CLEANING

A. The purpose for cleaning of the sewer or drain is to facilitate the inspection and/or rehabilitation of the sewer or drain, or to increase pipe capacity.

B. It is the intent of this Contract that sewers or drains be cleaned by either hydroflushing with jetting and vacuum truck, or manual scouring using pressure washing and vacuum truck.

1. Hydraulic equipment shall consist of high velocity type equipment, capable of jetting up to 2,000 psi and 125 gpm of water. No hydraulic equipment that operates under a "head of water" or that would cause excessive internal pressure shall be permitted without written approval of the Engineer.

C. The sewer or drain shall be cleaned using mechanical, hydraulically-propelled, and/or high-velocity pipe cleaning equipment, which does not exert internal pressures great enough to damage sewer or drain pipe and manholes. Selection of the cleaning equipment shall be based on the condition of the sewer or drain at the time work commences based on the Pre-rehabilitation/cleaning inspection. The equipment and methods selected shall be reviewed by the Owner.

D. Satisfactory precautions shall be taken to protect the sewer or drain from damage that could be inflicted by improper use of cleaning equipment. Any damage inflicted upon the sewer or drain due to improper use of cleaning equipment, regardless of the technique used, shall be repaired by the Contractor to the satisfaction of the Owner, at no additional cost to the Owner.

1. If areas of misalignment of pipe, dropped joints, infiltration, structural failures, or other obstructions are suspected during cleaning operations, and confirmed during exploratory televising, the Contractor shall record the approximate location of the defective area and notify the Owner.

E. All sludge, dirt, sand, rocks, grease, and other solid or semi-solid materials that may cause an obstruction in the sewer or drain or impair the inspection or rehabilitation of the sewer or drain shall be removed from the sewer or drain and site during cleaning operations (at least once each work day) in suitable watertight containers, and disposed of in a manner acceptable to the Engineer and in strict conformance with all applicable federal, state, and local laws and

regulations, at no additional cost to the Owner. It shall be the responsibility of the Contractor to secure a legal dump site for the disposal of the material.

1. The Contractor shall collect all data required by all permits or their issued conditions. It shall consist of periodic sampling and analysis of system effluents and discharge quantities.

G. Clean-up operations shall include all removal of debris out of manholes and off the ground around manholes and access pits. The Contractor shall not be allowed to accumulate debris and cleaning discharge materials on the project site unless stored in totally enclosed watertight containers approved by the Engineer.

H. Acceptance of the sewer or drain cleaning shall be made upon the successful completion of the television inspection and shall be to the satisfaction of the Engineer. For the purposes of these specifications cleaning shall be considered complete when eighty-five percent (85%) of the interior pipe surface area is visible during internal inspection in flow or limited flow conditions. Bypass pumping may be required to measure compliance with this standard. If the television inspection indicates that the cleaning has not been completed in accordance with these Specifications, the Contractor shall be required to re-clean and re-inspect the sewer or drain line until the cleaning is shown to be satisfactory, at no additional cost to the Owner. The Engineer may require the Contractor to pull a double squeegee (with each squeegee the same diameter as the sewer or drain) through each manhole section as evidence of adequate cleaning. Particular attention should be given to the adequacy of the cleaning to provide for the proper installation of the lining system.

I. The Contractor shall be responsible for locating and uncovering all known buried manholes required to complete the work at no additional cost to the Owner.

J. Maintain flow around the work in a manner that will not cause excessive surcharging of sewers or drains, and that will protect the public and private property from damage and flooding. Bypass pumping may be required to comply with this task. Refer to Section 01010 – SUMMARY OF WORK for the anticipated flow through the system.

K. No debris, equipment, tools, or other foreign matter shall be left in the sewers, drains and manholes, or at the work sites, as a result of the Contractor's operations.

1. A manhole may be used as a temporary collection point for debris. The debris shall be completely removed from the manhole by a vacuum truck, clamshell or other mechanical means before televising any type of pipe. Sandbags, or suitable equal, may be required to prevent flushed material from continuing downstream.

2. Any debris that migrates past the Contractor's efforts to collect the loosed material and then deposits in downstream MWRA interceptors shall be removed from the MWRA pipes at no additional costs to the Owner per Section 01500 – TEMPORARY FACILITIES AND CONTROLS.

L. All amounts of sludge, dirt, sand, rock, roots, grease, and other solids or semi-solid material shall be removed from the pipe interior with a collective device and disposed of by the Contractor at no additional cost to the Owner. All such material, may cause an obstruction or impair in the inspection or rehabilitation of the sewer or drain, and shall be flushed downstream and removed at each downstream manhole of the reach being cleaned with a collection device.

M. All of Contractor's personnel shall be thoroughly familiar with all phases of sewer or drain line cleaning to ensure optimum performance, without causing damage to the sewer, drain, manholes, and appurtenances.

N. When water from fire hydrants is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed at any time, nor shall a hydrant be used for the work described in these Contract Documents, unless a reduced pressure backflow preventor is provided by the Contractor and prior approvals have been obtained from the City of Somerville Water Department for use of the fire hydrant. Use of the backflow prevention device shall be in accordance to Massachusetts Department of Environmental Protection (DEP) Regulation 310. CMR 22.22 and approved by the Somerville Water Department Backflow Prevention Inspector. The Contractor shall be responsible for all related charges for the set-up, including the water usage bill. All expenses shall be considered incidental to the cleaning of the existing sewer or drain.

O. During the course of cleaning, when obstructions are encountered in an existing pipe, an attempt shall be made to clean from both the upstream and downstream manholes. Should the obstruction(s) prevent the line from being cleaned, the Engineer shall be immediately notified. If, in the opinion of the Engineer, a repair is required to facilitate cleaning, cleaning shall be completed upon satisfactory completion of the repair. The repair may be completed by the Owner or completed by the Contractor as a change order. No additional compensation will be paid to the Contractor for any portion of the sewer/drain, which requires re-cleaning after successful completion of the repair.

P. Approved type of equipment for pipe cleaning shall include, at a minimum, the following:

1. High velocity equipment shall have a minimum of 800 feet of high-pressure hose and carry its own water tank, auxiliary engines and pumps and hydraulically driven hose reel. Install a gauge to indicate working pressure on the discharge of high-pressure water pumps.

a. For unmanned jetting method, two or more high velocity nozzles shall be available. The nozzles shall be capable of producing a scouring action for 15° to 45° in all size lines designated to be cleaned. All controls shall be located so that the equipment can be operated above ground.

b. For manned pipe and manhole cleaning method, a high velocity gun shall be capable of producing flows from a fine spray to a long distance solid stream. Hand tools or intrinsically safe power tools may also be required.

2. Mechanical cutting device suitable for root removal shall be available for use as necessary.

3. Footage metering devices shall be used for location of all equipment, devices, points of reference, on measuring target that is known at all times at the ground level. Footage metering device shall be designed so that distance recorder can be set at zero when equipment or device is at entrance of pipe inside manhole. Entering device shall have an occurrence of not less than one-tenth of a foot. Marking of cable, or similar means, that require interpolation of depth of manhole shall not be permitted. The accuracy of the metering devices shall be checked daily by the Contractor by the use of a walking meter, roll-a-tape, or other suitable device.

Q. The Contractor shall be responsible for removal of any equipment that may become lodged or hung up in the system being cleaned. The Contractor will not be reimbursed for work, including television inspection, required to retrieve lost equipment.

R. The walls and inverts of all manholes within the reaches of lines shall be cleaned thoroughly with a high velocity water spray.

S. Upon completion of the cleaning of each section or in a flooded condition, a full sized brush or scraper shall be pulled through the line to insure complete removal of all debris from the line. Dumping or forcing of debris into a larger diameter line or receiving water body is not permitted.

T. Do not allow solids removed in the cleaning process to be released onto streets or into ditches, surface waters, catch basins, cleanouts, storm drains, or sewer or drain manholes.

U. Acceptance of sewer and storm drain cleaning work is subject to review by the Engineer. If visual inspection or internal television inspection shows solids, soil, sand, grit, or other debris remaining in the line, cleaning will be considered unsatisfactory. Repeat cleaning, and inspection of the storm drain line until the Engineer judges cleaning satisfactory.

V. Repair manholes dismantled or damaged during the cleaning process, and replace manhole frames and covers damaged during the cleaning process.

3.2 CLOSED CIRCUIT TELEVISION

A. The method of Technicolor internal inspection of pipelines and manholes is dependent on pipe size. The height of the camera shall be a level that is within the middle third of the pipe, preferably at the springline to equally capture the crown and invert of the pipe. The camera shall be at a level that can look up the first 12 inches of service laterals.

1. Where permitted, the preferred method of inspection shall be by use of a robotic camera vehicle assembly, capable of being controlled from an aboveground command center.

2. For larger pipes where the height of the camera crawler can't not be adjusted to the middle of the pipe, the inspection shall be obtained by use of manned entry and "walking the pipe".

B. The Contractor shall follow all OSHA standards or other applicable regulations related to work in confined spaces.

C. The Contractor shall provide to the Owner two (2) sets of DVDs of all internal inspections.

1. All field DVDs must be submitted in a casing with the names of all streets displayed on the front and side cover with field reports.

2. All final reports submitted along with the DVD must be bound together using an approved method, have street names with DVD numbers listed in alphabetical order along with the project title on the cover and have a clear plastic cover on the front. DVDs must be clearly labeled so that future viewers will be able to easily identify at any point of the DVD what location and type of sewer line was televised. The street address and type of all lateral connections to the storm drain shall be verbally noted on the DVD and in the report.

D. The reporting of observations during the TV inspection of sewer and drains from one manhole to the next, and the database shall follow the format published in the Pipeline Assessment and Certification Program (PACP) as developed by the National Association of Sewer Service Companies (NASSCO). The Owner may require additional database fields.

1. At the beginning and end of each continuous pipeline inspection, the total pipeline shall be described by the narrator stating the size, type, start and end location, street name, intersecting street, invert elevation, and limits of each pipe section.

E. The Contractor shall utilize the City's manhole identification numbering system when reporting the results of TV inspections. Contractor shall also provide written description or site map of each manhole such that the location of the manhole is clearly defined and retrievable. If a buried manhole is discovered during the televising of any mainline, the Contractor should allocate a new manhole number (supplied by Owner) and record it.

3.3 PROCEDURES

A. Prior to the internal inspection work, the Contractor shall be responsible for diverting all flows from the area to be inspected. Prior review and approval by the Engineer of the Contractor's intended methods shall be required for any flow control, diversion, bypassing, or dewatering activities.

B. During the internal inspection of pipelines, the Owner shall be able to view the pipe interior as it is being inspected on a TV monitor set up in the command center.

C. The camera and vehicle assembly shall be an industry standard for internally inspecting pipelines.

1. The camera shall be a Radial View Camera (RVC) able to view 360° and has the capability to pan and tilt in any direction. Picture quality shall be such as to produce a continuous 600-line resolution picture showing the entire periphery of the pipe. Picture quality and definition shall be such that the interior of the pipe can be clearly seen in detail.

2. The camera and appurtenances shall be capable of operation in 100 percent humidity conditions.

3. The camera shall be capable of being moved through the sewer or drain pipe in either direction at uniform slow rate by means of manual cable winches, motorized mechanical equipment of indirect drive type, or carried by Confined Space Certified personnel.

4. The camera vehicle assembly shall be capable of slowing down or stopping at areas of interest.

5. At areas of interest, the camera shall be capable of rotating its lens to obtain a clearer, more direct viewing angle.

6. The camera vehicle assembly shall also have a high intensity light (50 to 100 foot-candles) feature so as to provide the proper amount of light for recording purposes.

7. When a mechanized crawler or floats are used, measurement along the pipeline shall be accurate to 0.10 feet. For large pipes that required

personnel to transport the camera, measurement along the pipeline shall be accurate to 1.0 foot.

D. All video recordings must, by electronic means, display continuously and simultaneously generated transparent digital information to include the date of recording, street name, pipe diameter, access manholes ID number, and the linear footage of the television crawler location. Manhole ID numbers to be provided by the owner.

Example: Medford Street S25COM0305 → S25COM 0205
8" SS

07-13-2005 156' 37"

E. All video recordings of manholes and structures shall have a time, date, and location display, as detailed in paragraph 3.3.D of this Section.

F. All inspections shall be documented on DVD media. The DVD shall be capable of being played on a DVD player. Reprocessed DVDs will not be acceptable.

G. During the inspection, the camera shall be stopped at the points where one or more of the following conditions are observed:

1. Infiltration/Inflow Sources

2. Lining Defects

3. Structural Defects, including broken pipe, collapsed pipe, cracks, and all other structural abnormalities.

4. Abnormal joint conditions, such as root intrusion, protruding pipes, in-line pipe size changes, mineral deposits, grease, obstructions, etc.

5. Pipe Connections

6. Obstructions, offset joints, misalignments, or other conditions that may affect pipe bursting, slip-lining or cured-in-place pipe rehabilitation operations.

All such conditions shall be recorded and shall be considered a point repair if the conditions inhibit rehabilitation work. Color photographs of all questionable conditions shall be taken and labeled as to location, condition, and date for subsequent review.

H. The Contractor will take and label still pictures for all extruding laterals, any locations where sections of the sewer pipe are missing or the pipe is near collapse or whenever directed by a City Representative. The Contractor shall provide a sketch showing tie distances from at least three permanent features

to the starting and ending manhole. A distance between the starting and ending manhole, as measured on the ground, shall be provided**.**

I For large pipe that exceed the limits of the mechanical crawler and required manned entry to "walk the pipe", intrinsically safe 2-way communication must be maintained between entrant(s) and spotter(s) and also between entrant(s) and command center to facilitate procedure in Paragraphs 3.3.G and 3.3.H of this Section.

1. Care shall be taken to accurately measure the footage throughout the inspection. If measurements recorded via cable length is inaccurate due to slack created while "walking the pipe", distances shall be obtained by alternate means (e.g. intrinsically safe laser measuring) and recorded in the written logs as such. Verbal correction on the audio track shall override any conflicting digital footage on the video display.

J. The Contractor shall be responsible for access to the sewer or drain system, including; locating, uncovering, and opening manholes, flow control diversion bypassing and/or dewatering within manholes, or pipe reaches, dewatering, surface restoration, and all other work required to perform the specified work to the Engineer's satisfaction.

K. All internal inspections shall be performed by a firm specializing in large diameter sewer/drain line inspections, and shall be witnessed by representative of the Pipelining Manufacturer (when applicable) and the Owner/Engineer.

3.4. DYE TRACING

A. In the event that a building or catch basin lateral requires dye tracing confirmation during the time of the television inspection, the Contractor shall coordinate the private property access with the television operations.

B. The Contractor shall introduce the dye into the system (e.g. catch basin, internal plumbing) and be responsible for recording the test result and providing to the City.

3.5 ACCEPTANCE

A. Internal inspection operations, both pre- and post-construction/cleaning, shall be considered for approval upon receipt by the Owner of the following:

1. Two (2) copies of the internal inspection reports including: DVD media showing pipelines, manholes, and structure inspections, and photographs complete with location, time, and date stamp depicting all information described in paragraph 3.3.G in this Section.

B. The rehabilitated sewer or drain shall not receive acceptance until final approval by the Owner.

PART 4 – COMPENSATION

Item 2760.1 --- Cleaning of Sanitary Sewers and Storm Drains

METHOD OF MEASUREMENT:
Payment for Cleaning of Sanitary Sewers and Storm Drains shall be based on the Lump Sum Price bid in the proposal. Measurement for payment for Cleaning of Sanitary Sewer and Storm Drains will be on a percent of the Lump Sum bid calculated by dividing the elapsed time to date by the contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT/INCLUSIONS:
Under the Unit Price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for Cleaning of Sanitary Sewer complete as indicated on the Drawings and Specifications, or as directed by the Owner or Engineer. This work shall include furnishing, installing, and/or performing the following: required submittals and work plans; securing a temporary dump site; storm and sewer flow handling including sand bagging, temporary plugs and bulkheads, dewatering and flow bypassing; making arrangements for a water source; loosening, cleaning, and extracting deposits throughout the structure; transporting material to/from dump site; end-of-day surface cleaning around access manhole; repair of any damage caused by the Contractor; restoration of surface; and incidental work not indicated for payment elsewhere.

Item 2760.2 --- Closed Circuit Television Inspection

METHOD OF MEASUREMENT:
Payment for Closed Circuit Television Inspection shall be based on the Lump Sum Price bid in the proposal. Measurement for payment for Closed Circuit Television Inspection will be on a percent of the Lump Sum bid calculated by dividing the elapsed time to date by the contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT/INCLUSIONS:
Under the Unit Price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for Closed Circuit Television Inspection complete as indicated on the Drawings and Specifications, or as directed by the Owner or Engineer. This work shall include furnishing, installing, and/or performing the following: required submittals and work plans; storm and sewer flow handling including sand bagging, temporary plugs and bulkheads, dewatering and flow bypassing; making arrangements for a water source; closed circuit television inspection; furnishing digital video and digital report files on DVD; repair of any damage caused by the Contractor; restoration of surface; and incidental work not indicated for payment elsewhere.

-END OF SECTION 02760-

SECTION 02761

FLOW BYPASS

ITEM 2761.1 FLOW BYPASS LUMP SUM

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Furnishing, installing, and testing a temporary system to bypass the flow of the existing infrastructure around the work in accordance with these Specifications.

2. Maintaining flow from main pipelines without interruption of service, and maintaining flow in lateral connections with minimal interruption of service.

3. Performing the work in a sequence that is the least disruptive to vehicular and pedestrian traffic and in a manner that shall protect the public from damage to persons and property.

B. Contractor shall design the bypass flow handling system.

1.2. RELATED TECHNICAL SECTIONS

A. Section 01500 – TEMPORARY FACILITIES AND CONTROLS

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Shop drawings and/or manufacturer's descriptive literature indicating materials, equipment and methods to complete bypass flow handling operations.

2. Work plan including the following items:

a. Location, configuration and routing of bypass flow handling pipes.

b. Staging area(s) for pumps and other equipment.

c. Upstream flow collection location and/or bulkheads.

d. Downstream discharge location.

e. Method of protecting structures that accept discharge flows.

f. Traffic Management Plan.

g. Roadway crossing details including hose ramps or trench details.

h. Noise Pollution Abatement Plan.

3. List of 24-hour emergency telephone numbers at which the Contractor may be reached.

B. Contractor shall submit a Certificate of Design (refer to SECTION 01300 – SUBMITTALS) for the bypass flow handling system and shall be responsible for the design of the following system components:

1. Pumps,

2. Generators and power sources,

3. Suction and discharge piping,

4. Temporary pipe supports and anchoring,

5. Pipe plugging and bulkheads,

6. Noise control equipment,

7. Calculation of average and maximum daily flows,

8. Calculations of static lift, friction losses, flow velocity and flow rate,

9. Systems testing and start-up,

10. Maintenance of system for off-construction hours,

11. Contingency plan and equipment for system failures,

C. Contractor shall submit complete documentation of qualifications as specified herein.

1.4 QUALITY CONTROL

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified.

B. The Contractor designing and installing the bypass flow handling system shall have completed at least five (5) projects of similar size and complexity as this project in the United States within the past three (3) years. Contractor may

employ the services of a subcontractor that specializes in this work to fulfill this requirement.

C. Rejection of any subcontractor and/or manufacturer by the Engineer due to insufficient qualifications shall not be grounds for modifications to the Contract Documents such as change in scope, time of completion or contract amount.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01600 – PRODUCTS, MATERIALS, AND EQUIPMENT.

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. The bypass flow handling equipment shall be of sufficient size and material to convey existing flows from one access structure to at least the next access structure immediately downstream of the work without overflow, spillage or discharge to the surrounding environment.

B. Contractor shall be fully equipped to operate and respond to any repair or replacement of the system (24 hours per day and 7 days per week) while the bypass flow handling system is in use.

C. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of emergency or breakdown. One standby pump for each size pump utilized.

D. Contractor shall incorporate noise reduction equipment to minimize impact on the surrounding environment. Such measures shall include insulated enclosures, hospital grade silencers or mufflers, equipment modifications and/or special equipment to limit noise to eighty (80) dBA at seven (7) feet or sixty (60) dBA at the nearest residence or business.

2.2 DESIGN CRITERIA

A. Contractor shall verify flow conditions in the existing system prior to the commencement of construction. The Contractor shall have no claim for additional compensation by reason of delay or inconvenience in adapting its operations to the need for maintaining existing flows.

B. Estimated flows are as follows. Flows are estimated from the maximum conveyance at the existing slope and diameter. Actual flows might vary and shall be verified by the Contractor.

a. Maximum Daily Flow: 5.5 MGD

PART 3 – EXECUTION

3.1 PREPARATION

A. Contractor shall perform all work in accordance with municipal, state and federal requirements.

B. Contractor shall obtain all permits required to perform work prior to the commencement of construction, at no additional cost to the Owner.

C. Prior to the commencement of construction, Contractor shall perform all possible preparatory work. The Contractor shall, at all times, conduct operations to interfere as little as possible with existing flows.

D. Prior to start-up of bypass flow handling system, Contractor shall notify, in writing each property owner whose service shall be shutdown albeit temporarily. Contractor shall prepare notifications in accordance with Owner's requirements.

E. The Contractor shall protect water resources, wetlands and other natural resources.

3.2 GENERAL

A. Contractor shall design the layout and routing of the bypass flow handling system to minimize disturbance to public and private land and to maintain access for pedestrians and traffic. Traffic shall be maintained throughout the bypass operations according to applicable standards and local requirements.

B. If excavation is required across roadways, all work shall be performed in accordance with municipal and/or state requirements.

C. Contractor shall furnish, install, maintain and operate all temporary facilities such as dams, pumping equipment, conduits and all other labor and equipment necessary to intercept the flow before it reaches points where it would interfere with the work.

D. Contractor may utilize pipelines in an existing parallel system as an alternative to installing a full bypass flow handling system pending approval by the Engineer and the Owner. Contractor shall submit a Certificate of Design prior to utilizing the parallel system and shall restore the parallel system to pre-construction conditions upon completion of construction.

E. Contractor shall design, furnish and install individual bypass flow handling systems for flowing lateral connections or high occupancy buildings.

F. The Contractor shall protect existing facilities from damage, during pumping activities.

G. Plugging or blocking of flows shall incorporate a primary and secondary plugging device. When plugging is no longer required for performance of the work, it is to be removed in a manner that permits flows to slowly return to normal without surge, surcharge or other major disturbance.

PART 4 – COMPENSATION

Item 2761.1 --- Flow Bypass

METHOD OF MEASUREMENT*:*
Measurement for payment for Flow Bypass will be based on a percent of the Lump Sum bid calculated by dividing the elapsed time to date by the original Contractual construction time limit as approved by the Engineer.

BASIS OF PAYMENT:
Payment for Flow Bypass will be based on the unit price bid for this item in the proposal. Under the Lump Sum price for Flow Bypass, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required to furnish, install, move, maintain and remove gravity or pumped flow bypasses complete as required to handle existing flows while completing the required elements of the Work at all locations. The work includes, but is not limited to; design of the bypass systems; pumps; suction hoses; discharge hoses; generators; install and remove temporary bulkheads; gravity bypasses including furnishing and installing pipe of all sizes at all depths; excavation for buried hoses or pipe; furnish and placing backfill around buried hoses and pipe; preparation of subgrade; temporary pavement over buried hoses or pipe; ramps; protection of bypass measures; emergency service during non-work hours; manning pumps or other bypasses as may be required; fittings, couplings and appurtenances; connections to existing and proposed pipes and structures; protection of discharge locations; and all incidental work not specifically included for payment elsewhere required to bypass existing flows in all storm drain, combined sewer or sanitary sewer.

SPECIAL NOTES ON EXCEPTIONS:
Items not included for payment herein include, but are not limited to; permanent bulkheads; bypass for CCTV and cleaning sections of pipe, and water main bypasses.

-END OF SECTION 02761-

SECTION 03300

CONCRETE

3300.1 CIP CONCRETE PIPE CONNECTIONS (CIP FIELD CLOSURES) EACH

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Furnishing, installing, and testing of cast-in-place concrete including formwork, reinforcement concrete, materials, mix design, placement procedures, and finishes.

2. Class A concrete is for reinforced concrete structures, manhole bases, special structures, reinforced concrete fills, and similar items as applicable.

3. Class B concrete is for non-reinforced concrete including cradles, encasements, thrust blocks, plugs, base for pavements, and similar concrete whether reinforced or not.

1.2 RELATED TECHNICAL SECTIONS

A. Section 03315 – GROUT

B. Section 07160 – BITUMINOUS DAMPPROOFING

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Product Data: For each type of manufactured material and product indicated.

2. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

a. Indicate amounts of mix water to be withheld at plant for later addition at Project site. However, addition of water at project site shall be limited to maximum amount printed on the concrete delivery ticket. Absent this information, no water shall be permitted to be added at project site.

3. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

4. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

   a. Cementitious materials and aggregates,

   b. Form materials and form-release agents,

   c. Steel reinforcement and reinforcement accessories,

   d. Admixtures,

   e. Waterstops,

   f. Curing materials,

   g. Bonding agents,

   h. Adhesives,

   i. Ready-mix concrete producer,

   j. Repair materials,

5. Detailed cold-weather protection methods.

6. Qualifications of concrete installer, manufacturer, and testing agency as specified in this Section.

1.4 QUALITY CONTROL

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified.

B. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

D. Testing Agency Qualifications: Contractor shall employ a testing agency, acceptable to the Engineer and qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."

2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01600 – PRODUCTS, MATERIALS, AND EQUIPMENT.

PART 2 – PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, Light Pole Piers, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, ¾ inch by ¾ inch, minimum.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 2 inch to the plane of the exposed concrete surface.

2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing and for walls which are part of water containing tanks or structures.

2.2 STEEL REINFORCEMENT

A. Reinforcing Materials shall have a recycled content of 30% or greater and shall conform to the following standards:

1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.

3. Plain-Steel Wire: ASTM A 82, as drawn.

4. Plain-Steel Welded Wire Reinforcing: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

5. Reinforcing shall be uncoated unless indicated otherwise on the Contract Drawings.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type II.

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Class: Severe weathering region, but not less than 3S.

2. Nominal Maximum Aggregate Size: 3/4 inch..

C. Water: Potable and complying with ASTM C 94.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

E. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

F. High Range Water Reducing Admixture: ASTM C494, Type F.

G. Crystalline Waterproofing Admixture: Xypex C-Series or approved equal.

2.6 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Profile: Ribbed.

2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Greenstreak.

b. Meadows: W. R. Meadows, Inc.

c. Vinylex Corporation.

B. Hydrophilic Waterstops: Manufactured as self-adhesive strips or caulk, for adhesive bonding to concrete.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Earth Shield Type 23 by J.P. Specialties, Inc..

b. Hydrotite by Greenstreak.

c. Ultra Seal by Adeka Corporation.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete. This product shall not be used as a substitution for curing compounds.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Volatile Organic Compounds (VOC) shall meet maximum emission limits of authorities having jurisdiction at project site.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Evaporation Retarder:

i. Eucobar; Euclid Chemical Co.

ii. E-Con; L&M Construction Chemicals, Inc.

iii. Confilm; BASF Construction Chemicals, LLC.

b. Clear, Waterborne, Membrane-Forming Curing Compound, 18 to 22 percent Solids:

i. Klear-Kote WBII 20 percent; Burke Chemicals.

ii. Dress & Seal WB; L&M Construction Chemicals, Inc.

iii. Vocomp-20; W. R. Meadows, Inc.

c. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:

i. Res-Cure; Atlas Tech Products.

ii. Lumiseal WB Plus; L&M Construction Chemicals, Inc.

iii. Vocomp-30; W. R. Meadows, Inc.

2.8 RELATED MATERIALS

A. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

B. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.

2. Fly ash and blast furnace slag shall not be used.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Concrete mixes shall be designed for the classes indicated below and in accordance with the requirements indicated.

Design Mix Schedule								
				Admixture				
Class	Specified Compressive Strength (psi)	Minimum Cement Content (lb/cy)	*Maximum Water/ Cementitious Ratio	% Air Entrainment	Corrosion Inhibitor (gal./cy)	Fiber Reinforcement (lb/cy)	Silica Fume (% wt. Cement)	Density and Aggregate Size
A	4,500	565	0.42	5+/-1	N/A	N/A	N/A	NW-3/4”
B	4,000	565	0.44	5+/-1	N/A	N/A	N/A	NW-3/4”

* Total water in mix at time of mixing, including free water in aggregates.

1. Mix Classifications: The design mix classes indicated above shall be used as indicated on the Drawings and as follows:

   Class A: Class A shall be used on all areas indicated on the drawings as follows: Structural (S Series) and Civil (C Series). Concrete shall be integral with high-range water reducer.
   Class B: Class B shall be used where ever low strength concrete fill is indicated.

2. Slump at point of placement shall be limited to 4”+/- 1”. With addition of high-range water reducer, slump at point of placement shall be limited to 7”+/- 2”.

2. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Engineer before using in work.

D. Admixtures: Subject to Engineer’s approval, use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture as required, for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use crystalline waterproofing admixture where indicated in the drawing details and specifications. Bituminous damp-proofing shall not be used as an alternate unless approved by the ENGINEER on a case-by-case basis.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is between 85°F and 90°F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90°F, reduce mixing and delivery time to 60 minutes.

PART 3 – EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch, for concrete surfaces exposed to view.

2. Class B, 1/4 inch, for other concrete surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete where indicated on Drawings.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50°F for 72 hours after placing concrete

provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained. When cold weather concrete requirements apply, formwork shall be left-in-place for a minimum of 7 days.

B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:

1. At least 70% of 28-day design compressive strength.

2. Determine compressive strength of in-place concrete by testing representative field cured test specimens according to ACI 301.

3. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.3 SHORES AND RESHORES

A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain required concrete cover. Do not tack weld crossing reinforcing bars, unless indicated on the Drawings.

1. Shop- or field-weld reinforcement according to AWS D1.4, only where indicated on the Drawings.

2. Do not install reinforcement into previously placed concrete.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.

2. Form using bulkhead forms with keys, unless otherwise indicated. Leave-in-place bulkhead forms are prohibited.

3. Use a bonding agent at locations where indicated on Drawings, and where fresh concrete is placed against hardened concrete surfaces.

3.6 WATERSTOPS

A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

B. Hydrophilic Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable and in accordance with manufacturer’s typical installation details. Provide minimum depth of concrete cover per manufacturer written instructions.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved in writing by Engineer.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

D. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.

1. Limit drop height of concrete off of chute to 48-inches.

2. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.

3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

4. Concrete shall be carefully consolidated on each side of waterstop.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

6. Pulling of welded wire fabric through wet concrete from subgrade is prohibited.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40°F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F and not more than 80°F at point of placement.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90°F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

A. The finish of formed surfaces shall proceed concurrently with, or immediately after the repair of surface defects. The selection of finishes shall be as indicated in the table below.

Concrete Finishes (Formed Surfaces) Location	**Finish**
Footings, exterior walls, pile caps, portions of grade beams below grade and all other concrete not exposed to view	Rough-Formed Finish

Walls, portions of grade beams above grade, and all other concrete surfaces exposed to view. Surfaces to be coated or covered with waterproofing, dampproofing, plaster or paint	Smooth-Formed Finish

B. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

C. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.

D. Smooth Rubbed Finish to Permanently Exposed Surfaces: Apply the following to smooth-formed finished concrete:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

3.10 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.

    b. Continuous water-fog spray.

    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial

application. Maintain continuity of coating and repair damage during curing period.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall employ qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports

during concrete placement according to requirements specified in this Section.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete, plus one set for each additional 50 cu. yd. or fraction thereof.

   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40°F and below and when 80°F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.

6. Cast and field cure one additional set of four standard cylinder specimens for each composite sample, when outside air temperature is below or expected to fall below 40°F that night. Also provide field cured cyclinders to determine strength for form removal.

7. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimen at 7 days, two at 28 days, and one at 56 days.

C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified

compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

E. Test results shall be reported in writing via FAX to Engineer, Owner, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency shall conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Engineer. Petrographical analysis to determine water/cement ratio cement content, hydrated cement content, etc. shall be performed by the testing and inspection agency as directed by the Engineer when test results indicate requirements have not been met.

PART 4 – COMPENSATION

Cast-In-Place Concrete Pipe Collar

Item 3300.1 --- CIP Concrete Pipes Connection (CIP Field Closures)

BASIS OF PAYMENT/INCLUSIONS:
Under the Unit Price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for the complete procurement, installation, and leakage testing/inspection of CIP Field Closures, complete as indicated on the Drawings and Specifications, or as directed by the Owner or Engineer. This work shall include furnishing, installing, and/or performing the following: exposure and protection of existing underground infrastructure; waterseal/waterstop; reinforcement and doweling; formwork (with removal); Class A and B concrete, and admixtures; brick masonry; dampproofing; concrete testing; and all appurtenances and incidental work.

METHOD OF MEASUREMENT:
Payment for Cast-In-Place Concrete Pipe Collar shall be based on the Unit Price bid in the proposal. Measurement for payment shall be based on the actual numbers of pipe collars installed complete and functional as shown on the Contract Drawings or as directed by the Owner or Engineer.

SPECIAL NOTES ON EXCLUSIONS:
The following item(s) are not included for payment under this item and are included for payment elsewhere: trenching (paid under installed pipe item); proposed pipe to be connected; disposal of material.

-END OF SECTION 03300-

SECTION 03315

GROUT

3315.1 SEALING AROUND PIPE PENETRATIONS LUMP SUM

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section includes the following:

1. Furnishing, installing, and testing all materials for grout including formwork, materials, mix design, placement procedures, and finishes

2. The following types of grout shall be covered in this Section:

a. Cement Grout

b. Non-Shrink Grout: This type of grout is to be used wherever grout is shown in the Contract Documents, unless another type is specifically referenced.

c. Epoxy Grout

d. Topping Grout

1.2 RELATED TECHNICAL SECTIONS

A. Section 03300 – CONCRETE

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS:

1. Submit certified test results verifying the compressive strength, shrinkage, and expansion requirements specified herein; and manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of non-shrink and epoxy grout used in the work.

2. Certified testing lab reports for tests indicated herein.

3. Test results and service report from the field tests and the demonstration and training session verifying the requirements indicated herein.

4. Certifications that grouts used on the project contain no chlorides or other chemicals that cause corrosion.

5. Manufacturer’s literature containing instructions and recommendations on the mixing, handling, placement, curing, and appropriate uses for each type of grout used in the WORK, and location of use. The current ICC-ES or IAPMO-UES report shall be submitted for all epoxy anchor grouts for adhesive anchors.

6. Manufacturer’s certification that its non-shrink grout does not contain aluminum, zinc, or magnesium powders as a method of expansion.

7. Submit manufacturer's written warranty as indicated herein.

8. Name and telephone number of grout manufacturer's representative who will give on-Site service. The representative shall have at least one year of experience with the indicated grouts.

1.4 QUALITY CONTROL

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified

B. Field Tests:

1. Cement Grout and Topping Grout

a. Compressive strength of cement grout and topping grout shall be tested in accordance with the requirements of ASTM C 1107. The frequency of tests shall conform to the requirements of Section 03300 – CONCRETE.

2. Prepackaged Grout

a. Compression test specimens shall be taken during construction from the first placement of each type of grout, and for each different batch number of each type of grout thereafter. The specimens will be made by the Owner or its representative.

b. Compression tests and fabrication of specimens for non-shrink grout shall be performed as specified in ASTM C 109. A set of three specimens shall be made for testing at 24 hour, 28 days, and each additional time period as appropriate.

c. Compression tests and fabrication of specimens for epoxy grout shall be performed as specified in ASTM C 579, Method B. A set of three specimens shall be made for testing at 24 hours, and each earlier time period as appropriate.

3. All grout, already placed, which fails to meet the requirements of these specifications, is subject to removal and replacement at no cost to the Owner.

4. The cost of all laboratory and field tests on grout shall be borne by the Contractor, and the Contractor shall assist the Owner in obtaining specimens for testing. The Contractor shall supply all materials necessary for fabricating the test specimens.

C. Construction Tolerances: Construction tolerances shall be as specified in the Section 03300 – CONCRETE, except as modified herein and elsewhere in the Contract Documents.

PART 2 – PRODUCTS

2.1 CEMENT GROUT

A. Cement Grout: Cement grout shall be composed of one part cement, three parts sand, and the minimum amount of water necessary to obtain the desired consistency. Where needed to match the color of adjacent concrete, white Portland cement shall be blended with regular cement as needed. The minimum compressive strength at 28 days shall be 4500 psi.

B. Cement grout materials shall be as specified in Section 03300 – CONCRETE.

2.2 PREPACKAGED GROUTS

A. Non-Shrink Grout:

1. Non-shrink grout shall be a prepackaged, inorganic, non-gas-liberating, non-metallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application.

2. Class A non-shrink grouts shall have a minimum 28 day compressive strength of 5000 psi; shall have no shrinkage (0.0%) and a maximum 4.0% expansion in the plastic state when tested in accordance with ASTM C-827; and shall have no shrinkage (0.0%) and a maximum of 0.2% expansion in the hardened state when tested in accordance with ASTM C 1090.

3. Class B non-shrink grouts shall have a minimum 28 day compressive strength of 5000 psi and shall meet the requirements of ASTM C 1090.

4. Application:

a. Class A non-shrink grout shall be used for the repair of all holes and defects in concrete members which are water bearing or in contact with soil or other fill material, grouting under all equipment base plates, and at all locations where grout is specified in the contract documents; except, for those applications for Class B non-shrink grout and epoxy grout specified herein. Class A non-shrink grout may be used in place of Class B non-shrink grout for all applications.

b. Class B non-shrink grout shall be used for the repair of all holes and defects in concrete members which are not water-bearing and not in contact with soil or other fill material, grouting under all base plates for structural steel members, and grouting railing posts in place.

2.4 CURING MATERIALS

A. Curing materials shall be as specified in Section 03300 – CONCRETE, for cement grout and as recommended by the manufacturer of prepackaged grouts.

2.5 CONSISTENCY

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application.

B. The slump for topping grout shall be adjusted to match placement and finishing conditions but shall not exceed 4 inches.

2.6 MEASUREMENT OF INGREDIENTS

A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurement shall not be allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 – EXECUTION

3.1 GENERAL

A. All surface preparation, curing, and protection of cement grout shall be as specified in Section 03300 – CONCRETE. The finish of the grout surface shall match that of the adjacent concrete.

B. The manufacturer of non-shrink grout and epoxy grout shall provide on-site technical assistance.

C. Base concrete or masonry must have attained its design strength before grout is placed, unless authorized by the Engineer.

3.2 GROUTING PROCEDURES

A. Prepackage Grouts: All mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

3.3 CONSOLIDATION

A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

PART 4 – COMPENSATION

Item 3315.1 --- Sealing around pipe penetrations

METHOD OF MEASUREMENT*:*
Measurement for payment for this item will be based on a percent of the Lump Sum bid equal to the percent of the work completed by the Contractor as approved by the Engineer.

BASIS OF PAYMENT/INCLUSIONS:
Under the lump sum price bid for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for the grout sealing of the sewer pipe penetration through the existing drain at station 4+80 complete as indicated on the Drawings and Specifications, or as directed by the Owner or Engineer. This work shall include furnishing, installing, and/or performing the following: pavement or sidewalk sawcutting; removal of brick, concrete, or bituminous sidewalk; excavation of bituminous concrete roadway; excavation; transporting material to/from soil staging area; temporary excavation support consisting of trench boxes, or timber or steel sheeting left in place and cut off below grade as per the Contract Specifications; removal of groundwater from the trench; handling groundwater recharged back to the soil; forming placing and curing grout diapers; furnishing, placing and compacting suitable backfill soil; furnishing, placing, grading and compacting gravel pavement sub-base; compaction testing; and all appurtenances and incidental work.

-END OF SECTION 03315-

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SECTION 07160

BITUMINOUS DAMPPROOFING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Cold-applied, cut-back (asbestos-free) bituminous dampproofing applied to the following surfaces:

a. Apply dampproofing to exterior below grade surfaces of new concrete walls and slabs.

b. Exterior, below-grade surfaces of all new manholes and drain structures.

c. Exterior, below-grade surfaces of other concrete items specified.

B. Bituminous dampproofing can be factory applied, providing the application meets coating manufacturer's requirements. Additional field coatings must be applied, as directed by Engineer, to repair any coating imperfections, and chipped or damaged areas.

1.2 SUBMITTALS

A. Submit the following in accordance with Section 01300 – SUBMITTALS.

1. Product Data: For each type of product indicated.

2. For informational purposes only, submit recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.

3. Material Certificates signed by manufacturers.

1.3 QUALITY CONTROL

A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified.

B. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.4 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01600 – PRODUCTS, MATERIALS AND EQUIPMENT.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt dampproofing to be performed according to manufacturers' written instructions.

B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has thoroughly cured.

C. Allow a minimum of 48 hours for drying before backfilling, unless a greater drying period is recommended by manufacturer.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cold-Applied, Cut-Back (Solvent-Based) Bituminous Dampproofing shall be:

a. Karnak 83 AF by Karnak Corporation,

b. Sealmastic by Meadows, W. R., Inc.,

c. Waterban 50 by Lambert Corporation,

d. or equal.

2.2 BITUMINOUS DAMPPROOFING (ASBESTOS-FREE)

A. Cold-Applied, Cut-Back (Solvent-Based) Bituminous Dampproofing:

1. Brush and Spray Coats: ASTM D 4479, Type I.

2. Trowel Coats: ASTM D 4586, Type I.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.

1. Begin dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

1. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated and shall be applied to subsequent coat(s).

2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coat(s).

B. Apply dampproofing to all exterior below grade concrete surfaces.

1. For application on structures extending above grade, apply from finished-grade line down.

3.4 COLD-APPLIED, CUT-BACK ASPHALT DAMPPROOFING

A. On all dampproofing applications: Apply two brush or spray coats at not less than 1.25 gallons/100 feet^2. for first coat and 1 gallons/100 feet^2. for second coat, or one trowel coat at not less than 4 gallons/100 feet ^{2}.

3.5 CLEANING

A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

PART 4 – COMPENSATION (Not Used)

-END OF SECTION 07160-

APPENDIX A

MEMORANDUM

TO: Michael Cunningham, PE
Gus O'Leary, PE

FROM: Beck Straley

DATE : 1/15/2016

SUBJECT: Medford/Pearl Sewer Environmental Conditions

CC: Richard Quateman, LSP

The following memorandum summarizes soil and groundwater conditions, and recommendations for soil and groundwater management, in the area of the proposed Medford/Pearl sewer replacement in Somerville, Massachusetts. The project consists of the replacement of approximately 80 linear feet of 28" diameter brick sewer near the Medford/Pearl Intersection (Main Project Area), and the repair of a section of drain near the Medford/School Street intersection (Secondary Project Area). Data in support of this memorandum includes observations and analytical results from a soil boring and monitoring well installed by Kleinfelder, as well as information presented in publicly available reports associated with adjacent Massachusetts Contingency Plan (MCP) Sites.

Soil Observations Analytical Results

On December 11, 2015, Kleinfelder advanced one soil boring, designated B-1, on Medford Street in Somerville, MA, as shown on Figure 1. The boring log is included as Attachment A. This boring was advanced to 20 feet below ground surface (bgs). Approximately 12" of asphalt overlying three feet of red sandy fill, followed by fine sand to approximately 17 feet bgs, and fat gray clay from 17 – 20 feet bgs was observed. No anthropogenic material was observed in the fill. Soil was screened using a photoionization detector (PID). An additional boring location, designated B-2, was attempted at three locations on School Street, immediately south of the intersection with Medford Street. Unmarked utilities, likely inactive communications lines and active sewer lines, were encountered and drilling in this location was abandoned. Shallow fill observed in the attempted boring locations appeared consistent with the fill observed at B-1.

One composite soil sample, with a grab for volatile organic compound (VOC) analysis, was collected from boring B-1 at 0 – 10 feet bgs, representing the interval anticipated to be displaced during construction activities. The sample was submitted to Con-Test Analytical of East Longmeadow, MA for analysis of disposal characterization parameters, including total petroleum hydrocarbons (TPH) by U.S. EPA Method 8015C; RCRA 8 metals; volatile organic compounds (VOCs) by U.S. EPA Method 8260C; semi-volatile organic compounds (SVOCs) by U.S. EPA Method 8270D; polychlorinated biphenyls by U.S. EPA Method 8082A, conductivity by Method 2510B, pH, flashpoint, and reactivity. Toxicity characteristic leaching procedure analysis was not performed, as no compounds were detected at concentrations above the RCRA "Rule of 20." Soil sample analytical results are tabulated on Table 1.

VOCs and PCBs were not detected at or above laboratory reporting limits. The SVOCs benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene and pyrene, and the metals arsenic, barium, chromium, and lead were detected at concentrations above laboratory reporting limits, but below natural background levels. TPH (110 mg/kg) and bis(2-ethylhexyl)phthalate (0.43 mg/kg) were also detected above laboratory reporting limits, but below applicable RCS-1 Reportable Concentrations. No analytes were detected at or above applicable RCS-1 Reportable Concentrations.

Groundwater Analytical Results

Soil boring B-1 was completed as a groundwater monitoring well, designated MW-1. Well construction is detailed on the attached boring log. On December 11, Kleinfelder developed monitoring well MW-1 with a whale pump, pumping the well dry five times (approximately 10 gallons purged).

On December 21, 2015, Kleinfelder sampled monitoring well MW-1 using standard low flow methodology. Groundwater was measured at 11.95 feet bgs. Groundwater samples were submitted to Con-Test for analysis of Massachusetts Water Resource Authority discharge parameters, including oil and grease (EPA Method 1664B), PCBs (EPA Method 608(1)), pesticides (EPA Method 608(2)), SVOCs (EPA Method 625), extractable petroleum hydrocarbons (EPH) (MassDEP Method), dissolved (field filtered) MCP-14 metals, VOCs (EPA Method 8260C), PAHs (EPA Method 8270D) and pH. Low flow field sheets are presented as Attachment B. Groundwater analytical results are summarized on Table 2 and were compared to MWRA discharge permit requirements. The only analyte detected above laboratory reporting limits was barium at 0.095 mg/L, orders of magnitude below applicable regulatory standards.

Adjacent Documented Releases

Two gasoline service stations, each with one or more documented releases of petroleum, are located adjacent to the project area.

Good Gas, RTN 3-3191

"Good Gas," is located at 345 Medford Street, on the northeast side of Medford Street near the intersection with Pearl Street. The Site has operated as a gasoline station since approximately 1937. VOCs were detected in groundwater during an Environmental Site Assessment in 1990, and MassDEP assigned Release Tracking Number (RTN) 3-3191.

A Phase I Initial Site Investigation (ISI) and Tier Classification for RTN 3-3101 was submitted to MassDEP in 1996. Soil samples were analyzed for VOCs and TPH. Analytical results indicated the presence of TPH in soil above the Method 1 S-1/GW-2 & GW-3 standards. TPH, toluene and xylenes were also detected above GW-2/GW-3 standards in groundwater samples collected from MW-5, located on the southeastern portion of the property adjacent to 343 Medford Street. A sheen was noted on the groundwater in MW-5, but non-aqueous phase liquid (NAPL) was not detected. Groundwater depth ranged from 7 to 9 feet bgs and groundwater flow was calculated to the south-southwest. In 1997, the underground storage tanks (USTs) on the site were replaced, and remedial excavation was performed. Soil samples were collected from the limits of excavation. Elevated levels of VOCs and TPH, below S-3 Risk Characterization Standards, were detected in excavation bottom samples. Initial post-excavation groundwater sampling showed MTBE in groundwater in one Site well above GW-3 Risk Characterization Standards, and other petroleum related constituents in groundwater at levels below GW-3 Standards. Additional groundwater sampling in 1998 showed a decrease in the concentration of MTBE to below the GW-3 standard. IES concluded that a condition of No Significant Risk under unrestricted conditions has been achieved, based on soil and groundwater concentrations below Method 1 cleanup standards, and submitted a Class A-2 Response Action Outcome (RAO).

Though residual petroleum contamination, below applicable standards, likely remains at the 345 Medford Street property, the only constituent detected in monitoring well MW-4, closest to Medford Street, was MTBE, below applicable standards, in 1996/1997. As MTBE degrades naturally over time, concentrations have likely decreased. This Site is not a likely source of impact to the Main Project Area.

XTRA Gas, RTNs 3-14183, 3-28903

"Xtra Gas," is located at 385 Medford Street, at the intersection of Medford and School Streets. The Site was first reported to MassDEP in June, 1998, for elevated VOCs detected during PID screening during UST replacement activities. The release was assigned RTN 3-14183. Nine USTs and 1,197 tons of impacted soil were removed. Initial investigations indicated that petroleum compounds were present, but below applicable standards, and a Class A-2 RAO was filed in 2000. In 2009, during a property transfer, additional borings were advanced and volatile petroleum hydrocarbon (VPH) fractions were detected above RCS-1 thresholds. Fingerprint analysis indicated that the petroleum

detected was greater than twenty years old, and not related to a new release. The A-2 RAO statement was retracted, and additional investigations were performed, confirming the presence of VPH fractions above Method 1 S-1 Standards. VPH and EPH compounds were detected in groundwater, but below Method 1 GW-2/GW-3 standards. Based on these results, an Activity and Use Limitation was recorded for the property, restricting the Site to commercial or industrial uses and requiring the oversight of a Licensed Site Professional for any activities which would disturb Site soil. A revised Class A-3 RAO was submitted in June 2012

Additionally, during the property transfer in 2009, during the removal of a 12,000 gallon UST, a release from the UST piping was detected. 57 cubic yards of impacted soil were removed and RTN 3-28903 was assigned, and a Class A-2 RAO was submitted.

As of the last groundwater sampling event performed at 385 Medford Street in February, 2012, monitoring well MW-4 located at the northern property corner nearest the Medford/School Street intersection, contained VPH and EPH compounds above laboratory reporting limits, but below GW-2/3 standards. Groundwater was encountered between 5.71 and 7.70 feet below grade and flowed to the north. As further discussed below, petroleum compounds, likely below applicable regulatory thresholds, may be present in the Secondary Project Area from this Site.

Discussion and Recommendations

Main Project Area- Boring B-1

The Main Project Area is characterized by soil and groundwater samples from boring B-1. In soil, no analytes were detected above natural background concentrations, nor were there any visual or olfactory indications of contamination. As such, excavated material from 0 – 10 feet bgs, as precharacterized in this location, is considered suitable for reuse either at a less than RCS-1 facility or at a Massachusetts unlined landfill. Kleinfelder recommends that if a <RCS-1 facility is selected, that facility should have entered into an Administrative Consent Order (ACO) issued by MassDEP. Two such facilities are currently available - St. Mary's Cemetery in Tewksbury MA and Overlook Farm in Rutland MA, with more anticipated to become available. An ACO ensures compliance with Massachusetts Contingency Plan (MCP) regulations by setting forth time tables, Fill Management Plan requirements and sampling schedules, third party inspections and reporting requirements to reduce liability associated with soil reuse and disposal. Soil may also be reused at the point of excavation, or as fill at other locations, pending approval of the receiving site by a Licensed Site Professional representing the City of Somerville. All excavated soil should be transported under a MassDEP Material Shipping Record (MSR) and requires approval from the receiving facility prior to transportation and reuse.

While no contamination was encountered in boring B-1, considerable heterogeneity is possible due to the variable nature of historic fill. If conditions encountered during excavation differ from those described in boring B-1, additional analysis may be required and disposal recommendations may change. If conditions in the project excavation are consistent with those encountered in boring B-1, Kleinfelder recommends that the data presented in this memorandum be used disposal characterization and that additional samples be collected only if required by the receiving facility.

Groundwater may be managed by recharge at the point of excavation, or by permitted discharge to the MWRA system. No compounds were detected above MWRA discharge permit requirements. Kleinfelder anticipates that an MWRA discharge permit can be obtained with the data presented in this memorandum, and that only sediment filtration will be required for pre-treatment. It will be the contractor's responsibility to obtain the MWRA permit, determine if additional sampling is required, design any necessary pretreatment, and ensure compliance with the permit. Alternatively, recovered groundwater may be stored in a frac tank or tanker truck and disposed of at a licensed treatment facility.

Secondary Project Area

The planed boring in the secondary project area was not completed due to subsurface utility conflicts. The primary source of potential contamination at this location is the adjacent gas station at 385 Medford Street. When last sampled in 2012, the monitoring well closest to the secondary project area contained elevated VPH and EPH concentrations, though below applicable standards. While concentrations of petroleum compounds tend to decrease with time and likely decrease with distance from the Site, petroleum odors, staining, and elevated concentrations of petroleum hydrocarbons in soil and/or groundwater may be encountered.

If excavation is performed at this location, excavation should be observed by an experienced environmental professional and screened for VOCs using a PID. Regardless of the field observations, soil should be reused at the point of excavation if geotechnically feasible. If petroleum impact is not observed and soil is visually consistent with observations at B-1, excess soil generated is anticipated to be suitable for management with or in the same manner as that in the Main Project Area.

If petroleum impacted soil is encountered it should be preferentially reused at the point of excavation. If petroleum impacted soil cannot be reused at the area of excavation, this soil should be stockpiled in a lined roll off container or on and under polyethylene sheeting pending sampling and analysis for disposal.

If dewatering is performed, groundwater should be recharged at the point of excavation if feasible. If no petroleum impact is observed in soil and the water does not exhibit a

petroleum odor or sheen, it may be discharged to the MWRA system under an MWRA Permit as permitted in the Main Project Area. If petroleum impact is encountered, additional analysis should be performed prior to discharge to determine treatment requirements. Alternatively, recovered groundwater may be stored in a frac tank or tanker truck and disposed of as an oily liquid (MA001).

KLEINFELDER - 215 FIRST ST STE 320 | CAMBRIDGE, MA 02142 | PH:617-497-7800 | FAX:617-498-4630 | www.kleinfelder.com

SCALE 1" = 20'

0 20 40 60

SCALE IN FEET

ATTEMPTED B-2 LOCATIONS

B-1

SCHOOL STREET

MARSHALL STREET

MASSACHUSETTS COORDINATE SYSTEM
MAINLAND ZONE (NAD83/2011)(EPOCH 2010.00)

SHEET C-1	BORING LOCATION PLAN STA. 0+00 TO STA. 5+50	DATE JANUARY 2016				KLEINFELDER Bright People. Right Solutions.
		PROJECT NO.20161367.002A				
		DRAWN BY LK				
	CITY OF SOMERVILLE, MASSACHUSETTS MEDFORD ST AND PEARL ST SEWER DESIGN	CHECKED BY GO				
		FILE NAME MedfordPearl-ENV-BORING PLAN	REVISIONS			

Soil Sample Analytical Results

Parameter	Reportable Concentrations (RCs)		SAMPLING LOCATION
	RCS-1	RCS-2	B-1 (0-10)
Sampling Date			12/11/2015 10:30:00 AM
Sample Depth			0-10 Feet
SM 2540G (% Wt)			
% Solids	~	~	96.0
SM21-22 2510B Modified (µmhos/cm)			
SPECIFIC CONDUCTANCE	~	~	17
SW-846 1010A (°F)			
FLASHPOINT	~	~	> 212 °F
SW-846 6010C (mg/Kg dry) Metals Digestion			
ARSENIC	20	20	2.9
BARIUM	1000	3000	22
CADMIUM	70	100	ND (0.26)
CHROMIUM	100	200	7.2
LEAD	200	600	4.2
SELENIUM	400	700	ND (5.2)
SILVER	100	200	ND (0.52)
SW-846 7471B (mg/Kg dry) Metals Digestion			
MERCURY	20	30	ND (0.026)
SW-846 8015C (mg/Kg dry)			
DIESEL RANGE ORGANICS	~	~	110
SW-846 8082A (mg/Kg dry)			
PCB 1016	1	4	ND (0.10)
PCB 1221	1	4	ND (0.10)
PCB 1232	1	4	ND (0.10)
PCB 1242	1	4	ND (0.10)
PCB 1248	1	4	ND (0.10)
PCB 1254	1	4	ND (0.10)
PCB 1260	1	4	ND (0.10)
PCB 1262	1	4	ND (0.10)
PCB 1268	1	4	ND (0.10)
SW-846 8260C (mg/Kg dry)			
Total VOCs	~	~	ND
SW-846 8270D (mg/Kg dry)			
BENZO(B)FLUORANTHENE	7	40	0.19
BIS(2-ETHYLHEXYL)PHTHALATE	90	600	0.43
CHRYSENE	70	400	0.20
FLUORANTHENE	1000	3000	0.31
INDENO(1,2,3-CD)PYRENE	7	40	0.22
PHENANTHRENE	10	1000	0.18
PYRENE	1000	3000	0.34
SW-846 9014 (mg/Kg)			
REACTIVE CYANIDE	~	~	ND (3.9)
SW-846 9030A (mg/Kg)			
REACTIVE SULFIDE	~	~	ND (19)
SW-846 9045C (pH Units)			
PH	~	~	8.4

NOTES:

1. An asterisk (*) following a detection limit indicates that the minimum laboratory reporting limit exceeds one or more of the regulatory criteria.
2. ND = Not detected above the lab reporting limits shown in parenthesis.
3. NT = Not tested.
4. ~ = No Method 1 Standard or UCL available
5. Shaded values exceed the MCP Reportable Concentrations (RCs).
6. Bolded values exceed the Method 1 Cleanup Standards.

Parameter	Reportable Concentrations (RCs)		SAMPLING LOCATION
	RCGW-1	RCGW-2	MW-1
Sampling Date			12/21/2015 10:00:00 AM
Sample Depth			
EPA 1664B (mg/L)			
OIL & GREASE (HEM)	~	~	ND (1.4)
EPA 608(1) (µg/L)			
PCB 1016	0.5	5	ND (0.20)
PCB 1221	0.5	5	ND (0.20)
PCB 1232	0.5	5	ND (0.20)
PCB 1242	0.5	5	ND (0.20)
PCB 1248	0.5	5	ND (0.20)
PCB 1254	0.5	5	ND (0.20)
PCB 1260	0.5	5	ND (0.20)
EPA 608(2) (µg/L)			
ALDRIN	0.5	2	ND (0.050)
ALPHA-BHC	500	5000	ND (0.050)
BETA-BHC	100	1000	ND (0.050)
DELTA-BHC	100	1000	ND (0.050)
GAMMA-BHC (LINDANE)	0.2	4	ND (0.030)
CHLORDANE	2	2	ND (0.20)
4,4'-DDD	0.2	50	ND (0.080)
4,4'-DDE	0.05	400	ND (0.040)
4,4'-DDT	0.3	1	ND (0.080)
DIELDRIN	0.1	0.5	ND (0.0020)
ENDOSULFAN I	2	2	ND (0.050)
ENDOSULFAN II	2	2	ND (0.080)
ENDOSULFAN SULFATE	~	~	ND (0.080)
ENDRIN	2	5	ND (0.080)
ENDRIN ALDEHYDE	100	1000	ND (0.080)
ENDRIN KETONE	~	~	ND (0.080)
HEPTACHLOR	0.4	1	ND (0.050)
HEPTACHLOR EPOXIDE	0.2	2	ND (0.050)
METHOXYCHLOR	10	10	ND (0.50)
TOXAPHENE	100	1000	ND (1.0)
EPA 625 (µg/L)			
ACENAPHTHENE	20	6000	ND (5.0)
ACENAPHTHYLENE	30	40	ND (5.0)
ANTHRACENE	30	30	ND (5.0)
BENZIDINE	100	1000	ND (20)
BENZO(A)ANTHRACENE	1	1000	ND (5.0) *
BENZO(A)PYRENE	0.2	500	ND (5.0) *
BENZO(B)FLUORANTHENE	1	400	ND (5.0) *
BENZO(G,H,I)PERYLENE	20	20	ND (5.0)
BENZO(K)FLUORANTHENE	1	100	ND (5.0) *
4-BROMOPHENYL PHENYL ETHER	1000	10000	ND (10)
BUTYLBENZYLPHTHALATE	1000	10000	ND (10)
4-CHLORO-3-METHYLPHENOL	10000	100000	ND (10)
BIS(2-CHLOROETHOXY)METHANE	5000	50000	ND (10)
BIS(2-CHLOROETHYL)ETHER	30	30	ND (10)
BIS(2-CHLOROISOPROPYL)ETHER	30	100	ND (10)
2-CHLORONAPHTHALENE	10000	100000	ND (10)
2-CHLOROPHENOL	10	7000	ND (10)
4-CHLOROPHENYLPHENYL ETHER	10000	100000	ND (10)
CHRYSENE	2	70	ND (5.0) *
DIBENZ(A,H)ANTHRACENE	0.5	40	ND (5.0) *
DI-N-BUTYLPHTHALATE	500	5000	ND (10)
1,3-DICHLOROBENZENE	100	6000	ND (5.0)
1,4-DICHLOROBENZENE	5	60	ND (5.0)
1,2-DICHLOROBENZENE	600	2000	ND (5.0)

Parameter	Reportable Concentrations (RCs)		SAMPLING LOCATION
	RCGW-1	RCGW-2	MW-1
Sampling Date			12/21/2015 10:00:00 AM
Sample Depth			
3,3'-DICHLOROBENZIDINE	80	2000	ND (10)
2,4-DICHLOROPHENOL	10	2000	ND (10)
DIETHYLPHTHALATE	2000	9000	ND (10)
2,4-DIMETHYLPHENOL	60	40000	ND (10)
DIMETHYLPHTHALATE	300	50000	ND (10)
4,6-DINITRO-2-METHYLPHENOL	500	5000	ND (10)
2,4-DINITROPHENOL	200	20000	ND (10)
2,4-DINITROTOLUENE	30	20000	ND (10)
2,6-DINITROTOLUENE	1000	10000	ND (10)
DI-N-OCTYLPHTHALATE	10000	100000	ND (10)
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	500	5000	ND (10)
BIS(2-ETHYLHEXYL)PHTHALATE	6	50000	ND (10) *
FLUORANTHENE	90	200	ND (5.0)
FLUORENE	30	40	ND (5.0)
HEXACHLOROBENZENE	1	1	ND (10) *
HEXACHLOROBUTADIENE	0.6	50	ND (10) *
HEXACHLOROCYCLOPENTADIENE	500	5000	ND (10)
HEXACHLOROETHANE	8	100	ND (10) *
INDENO(1,2,3-CD)PYRENE	0.5	100	ND (5.0) *
ISOPHORONE	1000	10000	ND (10)
NAPHTHALENE	140	700	ND (5.0)
NITROBENZENE	5000	50000	ND (10)
2-NITROPHENOL	1000	10000	ND (10)
4-NITROPHENOL	1000	10000	ND (10)
N-NITROSODIMETHYLAMINE	500	5000	ND (10)
N-NITROSODIPHENYLAMINE	1000	10000	ND (10)
N-NITROSO-DI-N-PROPYLAMINE	500	5000	ND (10)
PENTACHLOROPHENOL	1	200	ND (10) *
2-METHYLNAPHTHALENE	10	2000	ND (5.0)
PHENANTHRENE	40	10000	ND (5.0)
PHENOL	1000	2000	ND (10)
PYRENE	20	20	ND (5.0)
1,2,4-TRICHLOROBENZENE	70	200	ND (5.0)
2,4,6-TRICHLOROPHENOL	10	500	ND (10)
MADEP-EPH-04-1.1 (µg/L)			
C9-C18 ALIPHATICS	700	5000	ND (100)
C19-C36 ALIPHATICS	14000	50000	ND (100)
UNADJUSTED C11-C22 AROMATICS	~	~	ND (100)
C11-C22 AROMATICS	200	5000	ND (100)
ACENAPHTHENE	20	6000	ND (2.0)
ACENAPHTHYLENE	30	40	ND (2.0)
ANTHRACENE	30	30	ND (2.0)
BENZO(A)ANTHRACENE	1	1000	ND (2.0) *
BENZO(A)PYRENE	0.2	500	ND (2.0) *
BENZO(B)FLUORANTHENE	1	400	ND (2.0) *
BENZO(G,H,I)PERYLENE	20	20	ND (2.0)
BENZO(K)FLUORANTHENE	1	100	ND (2.0) *
CHRYSENE	2	70	ND (2.0)
DIBENZ(A,H)ANTHRACENE	0.5	40	ND (2.0) *
FLUORANTHENE	90	200	ND (2.0)
FLUORENE	30	40	ND (2.0)
INDENO(1,2,3-CD)PYRENE	0.5	100	ND (2.0) *
2-METHYLNAPHTHALENE	10	2000	ND (2.0)
NAPHTHALENE	140	700	ND (2.0)
PHENANTHRENE	40	10000	ND (2.0)
PYRENE	20	20	ND (2.0)

Groundwater Analytical Results

Parameter	Reportable Concentrations (RCs)		SAMPLING LOCATION
	RCGW-1	RCGW-2	MW-1
Sampling Date			12/21/2015 10:00:00 AM
Sample Depth			
SM21-22 4500 H B (pH Units)			
PH	~	~	6.8
SW-846 6010C (mg/L) Metals Digestion			
ANTIMONY	0.006	8	ND (0.050) *
ARSENIC	0.01	0.9	ND (0.010)
BARIUM	2	50	0.095
BERYLLIUM	0.004	0.2	ND (0.0040)
CADMIUM	0.004	0.004	ND (0.0040)
CHROMIUM	0.1	0.3	ND (0.010)
LEAD	0.01	0.01	ND (0.010)
NICKEL	0.1	0.2	ND (0.010)
SELENIUM	0.05	0.1	ND (0.050)
SILVER	0.007	0.007	ND (0.0050)
THALLIUM	0.002	3	ND (0.050) *
VANADIUM	0.03	4	ND (0.010)
ZINC	0.9	0.9	ND (0.020)
SW-846 7470A (mg/L) Metals Digestion			
MERCURY	0.002	0.02	ND (0.00010)
SW-846 8260C (µg/L)			
ACETONE	6300	50000	ND (10)
TERT-AMYLMETHYL ETHER	~	~	ND (0.50)
BENZENE	5	1000	ND (1.0)
BROMOBENZENE	1000	10000	ND (1.0)
BROMOCHLOROMETHANE	~	~	ND (1.0)
BROMODICHLOROMETHANE	3	6	ND (1.0)
BROMOFORM	4	700	ND (1.0)
BROMOMETHANE	7	7	ND (5.0)
2-BUTANONE (MEK)	4000	50000	ND (10)
N-BUTYLBENZENE	~	~	ND (1.0)
SEC-BUTYLBENZENE	~	~	ND (1.0)
TERT-BUTYLBENZENE	1000	10000	ND (1.0)
TERT-BUTYLETHYL ETHER	~	~	ND (0.50)
CARBON DISULFIDE	1000	10000	ND (5.0)
CARBON TETRACHLORIDE	2	2	ND (1.0)
CHLOROBENZENE	100	200	ND (1.0)
CHLORODIBROMOMETHANE	2	20	ND (0.50)
CHLOROETHANE	1000	10000	ND (2.0)
CHLOROFORM	50	50	ND (2.0)
CHLOROMETHANE	1000	10000	ND (5.0)
2-CHLOROTOLUENE	1000	10000	ND (1.0)
4-CHLOROTOLUENE	1000	10000	ND (1.0)
1,2-DIBROMO-3-CHLOROPROPANE	100	1000	ND (2.0)
1,2-DIBROMOETHANE (EDB)	0.02	2	ND (0.50) *
DIBROMOMETHANE	5000	50000	ND (1.0)
1,2-DICHLOROBENZENE	600	2000	ND (1.0)
1,3-DICHLOROBENZENE	100	6000	ND (1.0)
1,4-DICHLOROBENZENE	5	60	ND (1.0)
DICHLORODIFLUOROMETHANE	10000	100000	ND (2.0)
1,1-DICHLOROETHANE	70	2000	ND (1.0)
1,2-DICHLOROETHANE	5	5	ND (1.0)

Groundwater Analytical Results

Parameter	Reportable Concentrations (RCs)		SAMPLING LOCATION
	RCGW-1	RCGW-2	MW-1
Sampling Date			12/21/2015 10:00:00 AM
Sample Depth			
1,1-DICHLOROETHYLENE	7	80	ND (1.0)
CIS-1,2-DICHLOROETHYLENE	20	20	ND (1.0)
TRANS-1,2-DICHLOROETHYLENE	80	80	ND (1.0)
1,2-DICHLOROPROPANE	3	3	ND (1.0)
1,3-DICHLOROPROPANE	5000	50000	ND (0.50)
2,2-DICHLOROPROPANE	5	9	ND (1.0)
1,1-DICHLOROPROPENE	0.5	5	ND (0.50)
CIS-1,3-DICHLOROPROPENE	0.5	5	ND (0.40)
TRANS-1,3-DICHLOROPROPENE	0.5	5	ND (0.40)
DIETHYL ETHER	1000	10000	ND (2.0)
DIISOPROPYL ETHER	1000	10000	ND (0.50)
1,4-DIOXANE	0.3	6000	ND (50) *
ETHYLBENZENE	700	5000	ND (1.0)
HEXACHLOROBUTADIENE	0.6	50	ND (0.50)
2-HEXANONE	1000	10000	ND (10)
ISOPROPYLBENZENE	10000	100000	ND (1.0)
P-ISOPROPYLTOLUENE	1000	10000	ND (1.0)
METHYL TERT-BUTYL ETHER (MTBE)	70	5000	ND (1.0)
METHYLENE CHLORIDE	5	10000	ND (5.0)
4-METHYL-2-PENTANONE (MIBK)	350	50000	ND (10)
NAPHTHALENE	140	700	ND (2.0)
N-PROPYLBENZENE	1000	10000	ND (1.0)
STYRENE	100	100	ND (1.0)
1,1,1,2-TETRACHLOROETHANE	5	10	ND (1.0)
1,1,2,2-TETRACHLOROETHANE	2	9	ND (0.50)
TETRACHLOROETHYLENE	5	50	ND (1.0)
TETRAHYDROFURAN	5000	50000	ND (2.0)
TOLUENE	1000	40000	ND (1.0)
1,2,3-TRICHLOROBENZENE	~	~	ND (2.0)
1,2,4-TRICHLOROBENZENE	70	200	ND (1.0)
1,1,1-TRICHLOROETHANE	200	4000	ND (1.0)
1,1,2-TRICHLOROETHANE	5	900	ND (1.0)
TRICHLOROETHYLENE	5	5	ND (1.0)
TRICHLOROFLUOROMETHANE	10000	100000	ND (2.0)
1,2,3-TRICHLOROPROPANE	1000	10000	ND (2.0)
1,2,4-TRIMETHYLBENZENE	10000	100000	ND (1.0)
1,3,5-TRIMETHYLBENZENE	100	1000	ND (1.0)
VINYL CHLORIDE	2	2	ND (2.0)
M/P-XYLENE	3000	3000	ND (2.0)
O-XYLENE	3000	3000	ND (1.0)
SW-846 8270D (µg/L)			
BENZO(A)ANTHRACENE	1	1000	ND (1.0)
BENZO(A)PYRENE	0.2	500	ND (0.20)
BENZO(B)FLUORANTHENE	1	400	ND (1.0)
BENZO(K)FLUORANTHENE	1	100	ND (1.0)
CHRYSENE	2	70	ND (2.0)
DIBENZ(A,H)ANTHRACENE	0.5	40	ND (0.50)
INDENO(1,2,3-CD)PYRENE	0.5	100	ND (0.50)

NOTES:

1. An asterisk (*) following a detection limit indicates that the minimum laboratory reporting limit exceeds one or more of the regulatory criteria.
2. ND = Not detected above the lab reporting limits shown in parenthesis.
3. NT = Not tested.
4. ~ = No Method 1 Standard or UCL available
5. Shaded values exceed the MCP Reportable Concentrations (RCs).
6. Bolded values exceed the Method 1 Cleanup Standards.

KLF-LOW FLOW GROUNDWATER SAMPLING RECORD

PROJECT NAME: Medford-Pearl Sewer Design | PROJECT #: 20161367.002A | WELL ID: MW-1

LOCATION: Medford Street at Pearl Street, Somerville, MA

SAMPLING CREW: T. Bernier | DATE: 12/21/2015 | SAMPLE TIME: 10:00 am

PURGING DATA

REFERENCE POINT: PVC (Steel Casing) | PURGING DEVICE: Peristaltic Pump | Begin Purge Time: 8:50 am

DEPTH TO WATER: 11.95 (FT) | WELL DEPTH: 17.00 (FT) | Well Diameter: 2"

CLOCK TIME	STATIC DEPTH (FT)	PURGE RATE (ML)	CUM. VOLUME PURGED (L)	TEMP (°C)	SP COND (uS/cm)	pH (s.u.)	ORP/Eh (MV)	DO (mg/L)	Turb (NTU)	COMMENTS
8:55	12.95	200 mL/min	1.00	12.21	3.419	7.01	149.5	2.90	58.8	
9:00	14.25	200 mL/min	2.00	14.25	3.615	6.91	161.9	2.28	844	Water became highly turbid.
9:05	15.10	200 mL/min	3.00	15.10	3.729	6.86	171.9	3.04	793	Well dry at 905, will allow to recharge and then sample.

FINAL FIELD DATA

pH: 6.86 (S.U.) | DO: 3.04 (mg/L) | COMMENTS: Well went dry at 9:05 am. Allowed to recharge until 10:00 am and proceeded

SPECIFIC CONDUCTANCE: 3.729 (uS/cm) | TURBIDITY: 793.0 (NTU)

TEMPERATURE: 15.1 (°C) | ORP: 171.9 (MV) | to collect the required samples. Well sampled from approximately half way up

ODOR AND PHYSICAL APPEARANCE OF SAMPLE: Clear, no odor noted. | screened interval to avoid highly turbid material towards the bottom of the well

WEATHER CONDITIONS: 50° F; 15-20 mph winds

WELL CONDITION DATA

Protective Casing Present:	(Y)	N	Concrete pad present:	(Y)	N	Cap on Riser:	Y	(N)
Protective Casing Locked:	Y	(N)	Standing Water:	Y	(N)	Visible Heaving:	Y	(N)
Physical Damage:	Y	(N)						

If yes, Describe:

SAMPLER'S SIGNATURE: Tyler Bernier

Stabilization Criteria:					
	pH	+/- 0.1	ORP	+/- 10 MV	Note: Three consecutive readings (3 or 5 min. intervals) required for stabilization
	Conductivity	+/- 3%	Turbidity	+/- 10% for > 5 NTU	Turbidity and DO: If three readings below 0.5 mg/L and/or 5 NTU, parameter stabilized.
	Dissolved O2	+/- 10% for > 0.5mg/L	Temp	+/- 3%	

APPENDIX B

SAMPLE/SAMPLER TYPE GRAPHICS

STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

- WATER LEVEL (level where first observed)
- WATER LEVEL (level after exploration completion)
- WATER LEVEL (additional levels after exploration)
- OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥4 and 1≤ Cc≤3		**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu <4 and/ or 1>Cc >3		**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu ≥4 and 1≤ Cc≤3		**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					**GW-GC**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu <4 and/ or 1>Cc >3		**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					**GP-GC**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES			**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					**GC**	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					**GC-GM**	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥6 and 1≤ Cc≤3		**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu <6 and/ or 1>Cc >3		**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu ≥6 and 1≤ Cc≤3		**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					**SW-SC**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu <6 and/ or 1>Cc >3		**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					**SP-SC**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES			**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					**SC**	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					**SC-SM**	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)				**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
					**CL**	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
					**CL-ML**	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
					**OL**	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit greater than 50)				**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
					**CH**	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
					OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

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DATE:	
REVISED:	-

GRAPHICS KEY

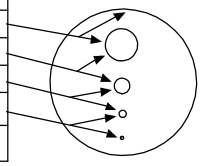
Medford & Pearl St. Sewer Separation
Medford & Pearl St.
Somerville, MA

PLATE

1

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



Munsell Color

NAME	ABBR
Red	R
Yellow Red	YR
Yellow	Y
Green Yellow	GY
Green	G
Blue Green	BG
Blue	B
Purple Blue	PB
Purple	P
Red Purple	RP
Black	N

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

Particles Present

Amount	Percentage
trace	<5
few	5-10
little	15-25
some	30-45
and	50
mostly	50-100

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

NOTE: AFTER TERZAGHI AND PECK, 1948

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (q_u)(psf)	CRITERIA
Very Soft	< 1000	Thumb will penetrate soil more than 1 in. (25 mm.)
Soft	1000 - 2000	Thumb will penetrate soil about 1 in. (25 mm.)
Firm	2000 - 4000	Thumb will indent soil about 1/4-in. (6 mm.)
Hard	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail
Very Hard	> 8000	Thumbnail will not indent soil

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

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CHECKED BY:
DATE:
REVISED: -

SOIL DESCRIPTION KEY

Medford & Pearl St. Sewer Separation
Medford & Pearl St.
Somerville, MA

PLATE
2

BORING LOG B-1

Date Begin - End:	12/11/2015	**Drilling Company:**	Carrdee		
Logged By:	L. Koska	**Drill Crew:**	J. DeSimone		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	B-69 Truck Rig	**Hammer Type - Drop:**	140 lb. Donut - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger/ Drive And Wash		
Weather:	Foggy/50sF	**Auger Diameter:**	4.25 in. I.D.		

Depth (feet)	Graphical Log	FIELD EXPLORATION Surface Condition: Bituminous Pavement Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	MONITORING WELL CONSTRUCTION* Completion Method: Flush mount cap in concrete
		12" Asphalt											
		S1:**Fill** **Well-graded SAND with Silt and Gravel (SW-SM)**: sub-angular to sub-rounded, non-plastic, red, moist, very dense, little silt, little gravel, PID = 0.7ppm. Cobbles at 2-ft		BC=39 100/1"	7"								Sand
		S2: Similar to S1. PID = 0.3ppm		BC=29 16 10 9	9"								Bentonite
		S3: **Poorly graded SAND (SP)**: fine-grained, tan, moist, medium dense, PID = 0.4ppm											2" SCH 40 Solid PVC Riser
5		S4: Similar to S3 except loose. PID = 0.2ppm		BC=6 4 4 3	15"								Sand
		S5: Similar to S3. Re-sampled S5 due to rock in sample tip. PID = 0.5ppm		BC=8 8 10 13	14"								
		S6: Similar to S3. PID = 0.2ppm		BC=6 8 9 8	24"								
10		S7: Similar to S3 except wet at 12'. PID = 0.4ppm Switched to 3-inch I.D. casing due to running sand. Positive head kept on hole.		BC=9 8 9 7	24"								2" SCH 40 Slotted 0.010 PVC Screen
15		Assumed lithology change based on drilling action											
		S8:**Lean CLAY (CL)**: medium plasticity, grey, moist, stiff, PID = 0.6ppm		BC=6 6 7 7	22"						40	19	
20													

The boring was terminated at approximately 20 ft. below ground surface. Monitoring Well installed to a depth of 17ft

GROUNDWATER LEVEL INFORMATION:
▼ Groundwater was observed at approximately 12 ft. below ground surface at the end of drilling.

GENERAL NOTES:
A PID was used for environmental field screening.

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PROJECT NO.:	20161367
DRAWN BY:	AG
CHECKED BY:	SJB
DATE:	12/24/2015
REVISED:	1/5/2016

BORING LOG B-1

Medford & Pearl St. Sewer Separation
Medford & Pearl St.
Somerville, MA

PLATE

B-1

PAGE: 1 of 1

APPENDIX C

1.0 PURPOSE

This guideline presents the requirements for construction activities in the vicinity of Spectra Energy's pipeline(s) or pipeline right-of-way and the movement of vehicles or mobile equipment within or across the right-of-way by parties other than Spectra Energy (herein referred to as the Company). These requirements are general in nature whereby specific circumstances may necessitate special considerations.

The following areas are addressed.

If any of the conditions stated in this document can not be satisfied, the Company representative shall be advised immediately.

2.0 PRE-CONSTRUCTION APPROVALS AND NOTIFICATIONS

2.1 Activities Requiring Company Approval

Prior to commencing work, the encroaching party shall obtain the Company's permission for any proposed excavation, construction or temporary crossing upon, along, over, under or across the Company's pipeline(s) or pipeline right-of-way as described below.

- Crossings with anything larger than a standard passenger vehicle or mobile equipment outside the traveled portion of a highway or public road.

- Construction of a facility such as:
  - New permanent buried facilities – water, gas, oil, sewer, electrical, fiber optic, drains, etc.
  - New permanent aboveground facilities – power, telecommunication, cable tv, etc.
  - New road or railroad installations or improvements
  - New developments, grade changes, structures, parking areas, ditches, etc.
  - Minor excavation activities – fences, trees, facility maintenance, etc.

- Excavation using explosives or power-operated (mechanical) equipment within the Company's pipeline right-of-way.

- Blasting activities (including seismic survey activities) in the vicinity of the Company's pipeline right-of-way (see Section 7.0)

If the encroaching party is considering an activity which is not

listed above, they should contact the Company representative to determine if their activity requires permission and subsequent approval.

2.2 Request for Encroachment

The encroaching party shall contact the Company to discuss details of the proposed construction or crossing activity and the information required for the Company's review.

Copies of any proposed plans and/or drawings may be required for certain construction or encroachment activities within or directly affecting the Company's pipeline right-of-way and shall be submitted to the Company for review and approval at least 30 days prior to the commencement of work.

2.3 Company Response to Encroachment Requests

The Company shall be given at least three (3) working days advance notice prior to the actual commencement of any construction, excavation or crossing activities over or near its pipeline right-of-way so that the Company may locate its pipeline(s) and have a field representative present during these activities.

Additional time for technical analysis may be needed for certain construction projects affecting the integrity of the Company's pipeline(s).

The Company representative will make a determination of the complexity of the proposed activity and the level of Company approval required.

3.0 SITE VISITS TO LOCATE FACILITIES

3.1 The Company considers it essential that landowners, builders, utility companies, developers and contractors know the location and depth of the Company's pipeline(s) and requires that the pipeline(s) be shown on any plans or drawings to be submitted for review.

3.2 If requested, the Company will field locate and mark its pipeline(s) at selected points in accordance with federal, state and/or local requirements at no cost to the encroaching party. However, if the Company representative requires the pipeline be located by excavation, the cost to excavate the pipeline and restore surface improvements (e.g., pavement, landscaping, and sidewalks) shall be the responsibility of the encroaching party. Note: A Company representative must be present during any excavation to expose the pipeline. During this period, accurate survey data of the Company's pipeline(s) may be requested by the Company. This data shall be obtained by a qualified surveyor provided by the encroaching party for the preparation of plan, section and profile drawings.

3.3 In addition to complying with the above requirements, the encroaching party shall comply with the provisions of all federal, state and/or local one-call regulations relating to excavation and demolition work in the vicinity of underground facilities.

4.0 ITEMS TO BE PROVIDED FOR REVIEW PROCESS

Simple residential driveways or utility crossings of the Company's pipeline right-of-way may not be subject to all of the requirements of this section. The Company will determine what information is required to be submitted for review on a case by case basis.

At a minimum the following information shall be provided with a request to the Company to determine if equipment/vehicle crossings and associated construction activity can be approved.

- a drawing or sketch showing the pipeline in relation to the proposed construction activity
- excavation plan including the method of installation of all facility crossings
- equipment description with weights and track/tire dimensions of any equipment/vehicles that may cross the Company's pipeline(s) during construction activity

In addition, any construction activity that requires the submission of drawings to a permitting agency for construction adjacent to or encroaching on the Company's pipeline(s) or pipeline right-of-way must include the information regarding Company facilities and pipeline right-of-way specified in this section.

4.1 Upon review of this specification and the incorporation of all applicable requirements, a complete set of design drawings showing existing conditions and proposed alterations shall be submitted to the Company for review.

4.2 Upon final approval from the Company, two (2) sets of the final (definitive) design drawings and an electronic copy shall be provided to the Company.

4.3 The Company's pipeline(s) and pipeline right-of-way limits shall be accurately shown on all drawings. Upon 72 hours advance notice, Company personnel will locate and mark the location of the Company's pipeline(s). The encroaching party's survey crew can then accurately locate the facility by a field survey.

4.4 The encroaching party's survey crew will be responsible for laying out the proposed facility in the field and locating the Company's facility horizontally and vertically, accurately representing it in the plan and profile views on the drawing(s). The Company's Region Technical Staff will evaluate field data to determine whether additional design requirements are necessary for areas of proposed equipment/vehicular travel.

5.0 GENERAL REQUIREMENTS

5.1 No buildings, structures or other obstructions may be erected within, above or below the Company's pipeline right-of-way. If requested, the Company will furnish pipeline easement information which describes the pipeline right-of-way width.

5.2 Wire type, stockade, decorative and similar type fencing that can be easily removed and replaced may cross the Company's pipeline right-of-way at or near right angles. Fences crossing the Company's pipeline right-of-way must have a minimum 10 foot wide gate for access. No fence shall be allowed within the Company's pipeline right-of-way parallel to the Company's pipeline(s).

5.3 Planting of trees is not permitted on the Company's pipeline right-of-way. The Company may side trim trees that overhang across the Company's pipeline right-of-way to eliminate obstruction of right-of-way visibility from the ground or air.

5.4 Planting of shrubs, bushes or other plants associated with landscaping on the Company's pipeline right-of-way is subject to Company approval and shall not exceed 5 feet in height at maturity. Shrubs, bushes or other plants shall not be installed within 10 feet of the Company's pipeline(s). The Company will not be responsible for the cost of replacing any landscaping damaged, destroyed or disturbed due to maintenance activities on the Company's pipeline right-of-way.

5.5 No drainage swales and no reductions in grade are permitted on the Company's pipeline right-of-way.

Limited additional fill may be deposited with prior written approval from the Company.

Proposed landscaping grades shall provide for 3 foot minimum cover over the Company's pipeline(s). The Company shall determine the maximum cover allowed over a Company pipeline(s) based on pipeline specifications and local conditions, including such issues as soil types. Proposed landscaping grades shall not exceed the Company's maximum allowable slope of 4:1 longitudinal with the pipeline and/or 8:1 cross-slope.

The Company reserves the right to modify these cover/grade requirements if deemed necessary. Proposed grades shall not restrict Company access to its right-of-way or cause ponding of surface water on the Company's pipeline right-of-way. Proposed grades shall not redirect the flow of water on to the Company's pipeline right-of-way or generate any amount of erosion on or near the Company's pipeline right-of-way.

5.6 A Company representative shall give prior approval for equipment/vehicles to cross the Company's pipeline(s) at any location.

Maximum and minimum depths of cover for all areas of equipment/vehicular travel (e.g., highways, roads, railroads, construction access, driveways, parking lots, etc.) will be determined by the Company and federal, state and/or local requirements. For this purpose, cover can be defined as the distance from the top of the pipeline to the finished grade. Mitigative methods where the cover is insufficient will be determined on a case by

case basis.

Additional cover, construction mats, or temporary structural spans shall be installed for the protection of the Company's pipeline(s) at the point where equipment/vehicles will be crossing unless approval to cross without protection is specifically granted by the Company. Installation and maintenance of the crossing shall be the responsibility of the encroaching party. The Company will provide specifications for the crossing of pipeline facilities.

5.7 Test pits are used to supply the encroaching party with accurate elevations of the Company's pipeline(s) and to determine the quality of the fill material around the pipeline(s). At the discretion of the Company, test pits may be required in areas where equipment/vehicle crossings and/or facility crossings are proposed. For additional information on test pits reference Sections 6.2 and 6.3.

5.8 Parking areas should be planned so as to avoid covering the Company's pipeline right-of-way if possible.

5.9 No roads, pipelines, cables or utilities may be installed parallel to the Company's pipeline(s) within the Company's pipeline right-of-way.

5.10 All pipelines, roads, electrical cables and other utilities shall cross the Company's pipeline right-of-way at an angle at or near right angles, if practical.

5.11 If, in the judgment of the Company, the proposed facility necessitates the installation of casing pipe and/or other

alterations to protect the Company's pipeline(s), the encroaching party will be required to execute a reimbursement agreement. The encroaching party will be required to pay the Company all or a percentage of the estimated cost of these alterations prior to the Company beginning any construction activity. Once the actual costs have been incurred and tabulated by the Company, cost variances shall be settled.

5.12 At the discretion of the Company, concrete slabs or other protective devices may be installed over the Company's pipeline(s) to provide protection. Design and installation drawings for the concrete slab/device will be provided to the encroaching party upon request.

5.13 All design standards mandated by federal, state and/or local government agencies shall be satisfied and a letter stating such shall be submitted to the Company prior to receiving final approval of the encroaching party's project.

6.0 EXCAVATION

Excavation operations shall be performed in accordance with the guidelines set forth below.

6.1 **No excavation, crossing, backfilling or construction operations near the Company's pipeline(s) or pipeline right-of-way shall be performed unless the Company representative is on site. The Company representative shall have full authority to stop the work if it is determined that the work is being performed in an unsafe manner or if a foreign object is spotted.**

6.2 During the period of April 15 - November 1 test pits may be performed by the encroaching party provided Company personnel are present. Test pits can be scheduled by contacting the applicable Company representative. The Company will make every effort to accommodate the encroaching party's schedule for excavation of test pits. Such scheduling however, is subject to availability of Company personnel, weather, field operating conditions, etc.

6.3 During the period of November 1 - April 15 test pit excavation of the pipeline by means of mechanical equipment is not allowed. In instances where the encroaching party must expedite the design process, pipeline elevations may be obtained, depending on field conditions, by hand digging or soft digging equipment. The encroaching party must contact the applicable Company representative to coordinate these activities.

6.4 Excavation shall not be permitted within the Company's

pipeline right-of-way until an excavation plan has been reviewed and approved by the Company representative. The excavation plan may be a written document or a verbal discussion with the Company representative. At a minimum, the excavation plan shall include but not be limited to the following:

- Backhoe set-up position in relationship to the pipeline
- Need for benching to level backhoe
- Required excavation depth and length
- Sloping and shoring requirements
- Ingress/egress ramp locations
- Minimum clearance requirements for mechanical equipment
- Pipeline location and depth
- Verify bar has been welded onto backhoe bucket teeth and side cutters have been removed
- Spoil pile location
- Compliance with applicable OSHA regulations

6.5 The use of mechanical equipment in the vicinity of the Company's pipeline(s) shall be directed by the Company representative in accordance with Company procedures and applicable one-call regulations. The tolerance zone for excavations using mechanical equipment is 18 inches (unless otherwise required by state law) until the pipeline is visually located. Hand tools or soft dig equipment shall be used to complete the final excavation of the pipeline inside the "restricted" mechanical equipment limits of the excavation.

6.6 The use of a trenchless excavation method (i.e., bored crossings) shall be employed in such a way as to ensure a minimum radial clearance required by applicable standards is obtained between the new facility and the Company's pipeline(s).

6.7 Federal regulations require that the Company's pipeline(s) be inspected whenever it is exposed. Applicable OSHA regulations pertaining to excavations must therefore be met to ensure the safety of the Company representative who must enter the excavation. Furthermore ample time should be provided to allow the Company to perform relevant inspections prior to proceeding with backfill operations.

7.0 BLASTING

Blasting operations shall be performed in accordance with the minimum guidelines set forth below.

7.1 The Company shall be advised of any blasting proposed within 200 feet of the Company's pipeline(s) and 500 feet for large scale quarry-type blasting. No blasting is permitted within the Company's pipeline right-of-way, and no blasting shall occur outside the Company's pipeline right-of-way if the Company determines that such blasting may be detrimental to its facilities.

7.2 The Company reserves the right to require that the party responsible for blasting furnish a detailed blasting plan at least three (3) working days prior to blasting to allow for evaluation and to make arrangements for a Company representative to witness the blasting operation, including drilling and loading holes. Applicable blasting codes shall be followed in all cases.

8.0 FACILITY CROSSINGS

All buried facilities shall be installed as noted below and as stated in Sections 5.9 and 5.10, as appropriate.

8.1 Buried facilities shall be installed below the Company's pipeline(s). The Company requires a minimum of 12 inches of clearance however in some situations this may need to be increased (e.g., bored crossings). Additional separation may be required in marshy areas or other areas where insufficient clearance would have a potential to cause future problems.

8.2 If the normal crossing requirements present undue difficulties as determined by the Company, buried facilities may be installed above the Company's pipeline(s) with prior approval from the Company representative. All such facilities shall be installed with a minimum of 12 inches of clearance. The Company will not be responsible for any damage or required repairs which are caused by the Company's operating and maintenance activities when facilities are installed above the pipeline(s). Protective measures such as a concrete encasement, ditch marking tape, and/ or above ground markers may be required as deemed necessary by the Company representative.

8.3 Suitable backfill shall be placed between the facility and the Company's pipeline(s). Suitable backfill is backfill free of rocks, refuse and any foreign material including, but not limited to, skids, welding rods, pipe rings, trash, tree and shrubbery limbs. In the case of anticipated crossing by equipment/vehicles the encroaching party shall provide specific material and

compaction specifications (AASHO or equivalent) for review by the Company.

8.4 The installation of test leads (two No. 10 THWN black insulated copper wires) attached at the point of crossing for corrosion control monitoring may be required for metallic lines as directed by the Company representative. Test wires shall be routed underground and terminated at a point specified by the Company.

8.5 The following requirements shall be met for fiber optic cables which encroach upon the Company's pipeline right-of-way.

8.5.1 High capacity fiber optic cable shall be installed in a rigid non-metallic conduit or covered in 6-8 inches of concrete which has been colored with an orange dye extending across the entire pipeline right-of-way. Other protective measures may be considered for non-high capacity cables.

8.5.2 The fiber optic cable shall be installed a minimum of 12 inches below the Company's pipeline(s) across the entire width of the pipeline right-of-way, unless approved by the Company representative.

8.5.3 Orange warning tape shall be buried a minimum of 18 inches directly above the fiber optic cable across the entire width of the Company's pipeline right-of-way, where practical.

8.5.4 The fiber optic cable crossing shall be clearly and permanently marked with identification signs on both

sides of the Company's pipeline right-of-way. Markings shall be maintained by the encroaching party for the lifetime of the facility.

8.6 The information listed below shall be furnished to the Company for all proposed electrical cables which will encroach upon the Company's pipeline right-of-way.

- Number, spacing and voltage of cables
- Line loading and phase relationship of cables
- Grounding system
- Position of cables and load facilities relative to pipeline(s)

8.7 Specific installation requirements for cables carrying less than 600 volts shall be determined by the Company on a case by case basis.

8.8 The following installation requirements shall be met for buried electrical cables carrying over 600 volts but less than 7,600 volts. The Company's Region Technical Staff will determine the installation procedures for buried electrical lines carrying voltages over 7,600 volts on a case by case basis.

8.8.1 The electrical cable shall be installed in a rigid non-metallic conduit covered in a minimum thickness of 2 inches of concrete which has been colored with a red dye extending across the entire width of the Company's pipeline right-of-way.

8.8.2 The electrical cable shall be installed a minimum of

12 inches below the Company's pipeline(s) across the entire width of the Company's pipeline right-of-way, unless approved by the Company representative.

8.8.3 Each phase conductor should be surrounded with a spirally wound, concentric neutral conductor. The neutral may be within the outer cable jacket.

8.8.4 Red warning tape shall be buried a minimum of 18 inches directly above the electric cable across the entire width of the Company's pipeline right-of-way, where practical.

8.8.5 The electric cable crossing shall be clearly and permanently marked with identification signs on both sides of the Company's pipeline right-of-way.

8.9 Overhead power line, telephone line and telecommunication installations shall be reviewed by the Company on an individual basis.

8.9.1 Overhead lines shall be installed with a minimum clearance of 25 feet above the grade of the Company's pipeline right-of-way. The installation of poles and guys will not be permitted on the Company's pipeline right-of-way, and not within 25 feet from a Company appurtenance, unless assurances are made that the encroachment will not affect the Company appurtenance as a result of a fault or failure.