

BID DOCUMENTS AND SPECIFICATIONS FOR:

**Wellington Park & Mill Brook Corridor  
Revitalization Project: Phase 3  
Arlington, Massachusetts**

Bid # 21-21

February 2021

Prepared for:

Park & Recreation Commission

Town of Arlington, Massachusetts

Prepared by: Hatch Associates Consultants, Inc.

**SEALED BIDS will be received:**

Date: March 17, 2021

Time: 11:00 AM

Place: Office of the Purchasing Agent

730 Massachusetts Avenue

Arlington, MA 02476

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END OF SECTION

**TOWN OF  
ARLINGTON  
MASSACHUSETTS**

**INVITATION TO  
BID**

**BID No. 21-21 WELLINGTON PARK & MILL BROOK CORRIDOR  
REVITALIZATION PROJECT: PHASE 3**

Sealed bids for Wellington Park & Mill Brook Corridor Revitalization Project: Phase 3 for the Town of Arlington, Massachusetts, will be received at the Purchasing Department, 730 Massachusetts Avenue, Arlington, MA 02476 until **10:00 AM prevailing time, on March 17, 2021** at which time and place said bids will be publicly opened and read aloud.

All bids must be in a sealed envelope plainly marked: **BID No. 21-21 WELLINGTON PARK & MILL BROOK CORRIDOR REVITALIZATION PROJECT: PHASE 3**

The scope of work includes drainage improvements, including a sediment forebay, bioretention basin, and a vegetated swale. Retrofit access modifications to an existing timber boardwalk. Porous bituminous concrete pathways. Tree, shrub, and herbaceous plantings. Removal of targeted invasive plant species. Landscape site improvements including naturalistic seating and exploration area, picnic table, wayfinding signage, landscape boulders and benches.

***Bid Security in the form of a bid bond, cash, certified check, treasurer's or cashier's check payable to the Owner, is required in the amount of five percent of the bid, in accordance with Section 00200, INSTRUCTIONS TO BIDDERS.***

A pre-bid site visit will be held on Monday, March 8, 2021 at 10:00 AM at Wellington Park, Arlington, MA.

All project work shall be completed by September 30, 2021.

Contract Documents and plans are available for down load and review on the Town Website:

**[www.arlingtonma.gov/purchasing](http://www.arlingtonma.gov/purchasing)**

The selected contractor shall furnish a performance bond and a payment bond in amount at least equal to one hundred percent (100%) of the contract price as stipulated in Section 00700 GENERAL CONDITIONS of these specifications.

By-law of the Town of Arlington, Title 1, Article 16, Minority/Woman Workforce Participation in Construction Projects which exceed \$200,000.00 is part and parcel of the bid.

Minimum Wage Rates as determined by the Commissioner of the Division of Occupational Safety of the Executive Office of Labor and Workforce Development under the provisions of the Massachusetts General Laws Chapter 149, Section 26 to 27D, as amended, apply to this project. It is the responsibility of the Bidder, before bid opening, to request if necessary, any additional information on Minimum Wage Rates for those trades people who may be employed for the proposed work under this contract.

OSHA Construction Training Required: As of July 1, 2006, under M.G.L. – Chapter 30, Section 39s, any person, submitting a bid for, or signing a contract to work on, the construction, reconstruction, alteration, remodeling or repair of any public work by the Commonwealth of Massachusetts/Town of Arlington, and estimated by the awarding Authority to cost more than \$10,000, shall certify on the Bid or Contract, under penalty of perjury, that all employees to be employed at the work will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration

All bids for this project are subject to applicable bidding laws of Massachusetts, including General Laws Chapter 30, Section 39M as amended.

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

The Owner reserves the right to waive any informalities or to reject any or all bids.

TOWN OF ARLINGTON

Adam W. Chapdelaine  
Town Manager

## **INSTRUCTIONS TO BIDDERS**

- I. COMPLEMENTARY DOCUMENT
  - A. INVITATION TO BID, including herewith, is complementary to this document and shall be reviewed by bidder for specific instruction which are not repeated herein.
  
2. STATUTES REGULATING COMPETITIVE BIDDING
  - A. Bidding procedures and award of general contract and subcontracts shall be in accordance with the provisions of Chapter 30, Section 39M and Chapter 149, Section 44A through 44L inclusive, of the General Laws of the Commonwealth of Massachusetts, including all current amendments.
  - B. In the event of any discrepancy or inconsistency between the provisions of these Bid and Contract Documents and the above-mentioned statutes, the provisions of the above-mentioned statutes shall govern. In such event, the application of all remaining provisions not in conflict to any circumstance other than that in which the conflict occurs shall not be affected thereby.
  
3. BIDDER'S QUALIFICATIONS
  - A. DCPO Certification not required.
  - B. The Contractors' Update Statements are not public records and will not be open to public inspection.
  
4. INTERPRETATION OF DOCUMENTS: NOTIFICATION OF ERRORS
  - A. Interpretations of the provisions of the Bid and Contract Documents will be made by the designer upon written request of any general bidder or subbidder, provided that such request is received by the Designer at least seven (7) days prior to the date of the applicable bid opening, and that the Designer considers such interpretation to be of sufficient importance. Oral or telephone interpretations will not generally be made, and if made shall be strictly informal and not legally valid or binding.
  - B. Such written interpretations shall be in the form of Addenda to the Bid and Contract Documents.
  - C. Bidders are urged to communicate all errors and discrepancies found in the Bid and Contract Documents to the Designer. Telephone calls pointing out any such errors or discrepancies will be taken by the Designer, but only for the purpose of receiving the information in order that it may be properly processed, and not for interpretation or clarification.
  
5. EXAMINATION OF BIDDING AND CONTRACT DOCUMENTS
  - A. Each Bidder shall carefully examine the Bid and Contract Documents to obtain a thorough understanding of the work of his bid in addition to the work of related trades. In addition, each General Bidder shall personally visit the

site to thoroughly acquaint himself/herself with the conditions as they exist hereon.

- B. Failure of any Bidder to thoroughly examine the Bid and Contract Documents or to visit and examine the site shall in no way relieve him/her of any obligation with respect to his/her bid or of any responsibility assigned to him under the Contract.

6. PRE-BID CONFERENCE

- A. Pre-bid conference will be held at the location and time stipulated in the Invitation to Bid.

7. MODIFICATION AND WITHDRAWAL OF BIDS

- A. Modification of withdrawal of Bids will be permitted after the submission of such bids provided clearly written, readily understandable instructions for same are received by the Owner in writing prior to the time established for opening of such bids. No Bid may be withdrawn after that time, except as otherwise provided herein or by law.

8. ADDENDA

- A. Addenda may be required during the bidding period to modify, clarify or interpret the Bid and Contract Documents. It is intended, but not guaranteed, that such Addenda shall be mailed by the Owner to all persons or parties to whom Bid and Contract Documents have been issued (Bidders of Record). Failure to receive such Addenda shall in no way relieve any bidder from the execution of its provisions. All bidders are cautioned to verify the number of Addenda which have been issued and to secure any needed copies from the Designer before submitting a Bid.

9. FORM FOR BIDS

- A. The Owner will make available, to every person applying therefor, a Bid Form. Each bona fide Bidder will be furnished forms for his proposal upon request. Such forms will be made available at the Owner's office during the regular office hours throughout the bidding period. Bids must be submitted on the forms provided by Owner or of forms included in the bid documents of the Project Manual.
- B. All blank spaces provided on the bid forms shall be filled in with ink or typewriter. Where space is provided, sums shall be expressed in both words and figures. In case of a discrepancy between the two, the written words shall govern.
- C. No interlineations, additional, alterations or erasures shall be made on the forms.

10. ALTERNATES

- A. Each Bidder shall bid on alternatives listed. In the event that any alternate does not involve a change in the amount of the Bid, the Bidder shall so



indicate by using the words "No Change" in the space provided for that alternate.

- B. General Bidders shall enter on the form for General Bid a single amount for each alternate, each amount to consist of the total of all the subbidders' amounts for the given alternate plus the amount of for work of the alternate to be performed by the General Contractor.
- C. If alternate(s) are accepted, they shall be accepted in the order listed. The low bidder will be determined on the basis of the sum of the Base Bid and the alternates accepted.

11. SUBMISSION OF BIDS

- A. The Bid Form shall be properly executed and enclosed with the required bid deposit in a sealed envelope plainly marked on the outside with the following information.

Bid For:

\_\_\_\_\_

SUBMITTED  
BY:

\_\_\_\_\_  
(Name of Bidder)

\_\_\_\_\_  
(Address of Bidder)

- B. If Bids are mailed; the above required envelope shall be enclosed in a second envelope identified with the above markings and mailed to the place of bid opening, as described in the Invitation to Bid. Mailed Bids must be received before the time scheduled for opening of Bids.

12. PERFORMANCE AND PAYMENT BONDS

- A. The Performance and Labor and Materials Payment Bonds required of the General Contractor shall each be in the amount of 100% of the contract sum from a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and approved by the Owner.

13. FOREIGN CORPORATIONS

- A. The attention of bidders is called to General Laws, Chapter 30, Section 39L, as amended by Acts of 1967, Chapter 3, under which the Owner may not enter into a contract with a foreign corporation as a subcontractor unless the foreign corporation has filed with the Owner a certificate by the State Secretary stating that the foreign corporation has complied with General Laws Chapter 181, Sections 3 and 5 and stating the date of such compliance.

14. AWARD OF CONTRACT

- A. The Contract will be awarded to the lowest responsible and eligible bidder except in the event of a substitution as provided by under Chapter 149, Sections 44E and 44F of the above-reference General Laws.

15. COMMENCEMENT AND COMPLETION OF WORK

- A. The successful bidder, upon completion of the Contract Agreement, shall commence the work of the Contract within seven (7) calendar days from receipt of written Notice to Proceed issued by the Owner within fourteen (14) calendar days after said execution of the Contract Agreement, and shall therefore diligently and continuously carry on the work in such manner as to substantially complete the work on or before September 30, 2021 except as noted herein.

16. LIQUIDATED DAMAGES

- A. The attention of bidders is particularly called to the requirements as to the conditions of employment to be observed, the minimum wage rates to be paid under the Contract and affirmative action to ensure equal employment opportunity.
- B. Contractor shall make full good faith efforts to secure at least ten percent (10%) of the Labor and Materials incorporated in the Work from Minority Business Enterprises and five percent (5%) of the Labor and Materials incorporated in the Work from Women Business Enterprises certified by the Commonwealth of Massachusetts and consistent with the Federal Equal Employment Opportunity requirements attached hereto as Attachment A. Satisfactory documentation of such effort shall be furnished promptly upon request by Owner.
- C. The Owner is an equal employment opportunity employer and has an active Affirmative Action Plan (AAP). For more information, direct correspondence to Emily Sullivan, Environmental Planner for the Town of Arlington.

**BID FORM**

For: Wellington Park & Mill Brook Revitalization Project: Phase 3 (Bid #21-21)

Proposal (BID) of \_\_\_\_\_  
(hereinafter called "Bidder") a corporation, organized and existing under the laws of the Commonwealth of Massachusetts.

\_\_\_\_\_ doing business as \_\_\_\_\_  
(corporation, proprietorship, partnership)

to the TOWN OF ARLINGTON hereinafter called "Owner". Gentlemen:

- A. The Bidder, in compliance with your invitation for bids for the Wellington Park & Mill Brook Corridor Revitalization Project: Phase 3, Arlington Massachusetts, having examined the plan and specifications with related documents and the site of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to commence work under this Contract on or before a date to be specified in the written "Notice to Proceed" from the Owner, and to complete the work by September 30, 2021. The Bidder further agrees to pay as liquidated damages, the sum of \$100.00 for each consecutive calendar day thereafter that the works remains incomplete, as provided in the Instruction to Bidders, Modifications to General Conditions. Required completion dates are as follows:

- B. Bidder acknowledges receipt of the following addendum:

\_\_\_\_\_ Dated \_\_\_\_\_  
\_\_\_\_\_ Dated \_\_\_\_\_  
\_\_\_\_\_ Dated \_\_\_\_\_

- C. Bidder agrees to perform all work described in the specifications and shown on the drawings, for the following lump sum price of:

- 1. Total Proposed Base Bid Contract Price:

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_ )

- 2. Bid Deposit on total bid price, including alternates, in the sum of:

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_ ) in

the form of \_\_\_\_\_ is submitted herewith in accordance with the INSTRUCTION FOR BIDDERS and is to become property of the Owner in the event the Contract and bonds are not executed within the time above set forth, as liquidated

damages for the delay and additional expense to the Owner caused thereby.

3. The Bid does not include premiums on Performance/Labor and Materials Bond. Cost of required Bond Premiums (for base bid and any and all alternates):

Bond Premiums Add \$\_\_\_\_\_

4. Alternates  
Not Applicable.
5. The Supplemental Unit Prices set forth herein shall be used to determine any equitable adjustment of the Contract in connection with the changes or extra work performed under this Contract as directed by the Town of Arlington.

It is mutually understood and agreed that such Supplemental Unit Prices include all items of costs, equipment, taxes and insurance of every kind, overhead, and profit for the Contractor and they shall be used uniformly, without modification for addition and deductions. Prices listed under ADDITIONS and DEDUCTIONS are to be the complete total price billed to and paid by the Town of Arlington therefor. There can be no more than fifteen (15) percent difference in price between the additions and deductions.

**SUPPLEMENTAL UNIT PRICES FORM**

<b>ITEM DESCRIPTION</b>	<b>UNIT</b>	<b>ADDITIONS</b>	<b>OWNER APPROVAL</b>
1. Loam Borrow (including grading and scarification)	CY		
2. Lawn Seed Mix and Tackifier (5 LBS/1,000 SF) (including straw mulch)	SY		
3. Meadow Seed Mix and Tackifier (1/2 LBS/1,000 SF) (including straw mulch)	SY		
4. Woodland Seed Mix and Tackifier (1 LBS/1,000 SF) (including straw mulch)	SY		
5. Erosion Control Blanket and Staking	SY		
6. Temporary Seed Establishment Fencing	LF		
7. Clearing and Grubbing	SY		
8. Selective Clearing of Invasive Species	DAY		

- D. If the Bid is accepted by the Owner, the undersigned agrees to complete the entire work provided to be done under the contract within the time stipulated by the Owner.
- E. The undersigned agrees that for extra work, if any, performed in accordance with the AGREEMENT, he will accept compensation as stipulated therein in full payment for such extra work.
- F. Bidder understands that the Owner reserves the right to reject any and all bids.
- G. The undersigned hereby agrees that he will not withdraw the Bid within sixty (60) consecutive calendar days after the actual date of the opening of Bids and that, if the Owner accepts this Bid, the undersigned will duly execute and acknowledge the required Contract Bonds within 10 days after notification that the AGREEMENT is ready for signature.

H. Should the undersigned fail to fulfill any of his agreements as here in before set forth, the Owner shall have the right to retain as liquidated damages the amount of the Bid security, which shall become the Owner/s property. If a bid was furnished as bid security, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.

I. The Undersigned certifies under penalty of perjury that this Bid is in all respect bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the "person" shall men natural person, joint venture, partnership, corporation or other business or legal entity.

J. The undersigned certifies that he is able to furnish labor that can work in harmony with all with all laws and regulations applicable to awards made subject forty-four A.

1. Have been in business under the present name for\_\_\_\_\_years.

2. Ever failed to complete any work awarded?\_\_\_\_\_(Yes),\_\_\_\_\_(No). If yes, explain: \_\_\_\_\_

3. Bank Reference: \_\_\_\_\_

K. The Bidder is required to state below all work he/she and his/her subcontractors (if subcontractors are to perform substantial portions of the work) has complete within the past 5 years of a similar character and value to that of the work included in the proposed Contract and to give references that will enable the Owners to judge the Bidder's experience, skill and business standing. The Bidder is required to list a minimum of 3 completed projects that are comparable in scope, complexity and value. For each project, include the name, location, type, date complete, construction value and owner contact.

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(add supplementary page if necessary)

L. The Bidder is required to state below all construction projects he/she currently has under contract. For each project, include the name, location, type, scheduled completion date, construction value and owner contact.

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M. The undersigned bidder hereby certifies that the tools and equipment required to meet the specified requirements of the Contract document, with special attention called to Section 02120 Earth Excavation, Backfill, Fill, and Grading, will be utilized in the performance of the work.

- N. The undersigned further certifies under the penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth of Massachusetts under the provisions of section 29F, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation declared there under.
  
- O. The undersigned bidder hereby certifies he/she will comply with the minority workforce percentage ratio and specific affirmative action steps contained in the EEO/AA provisions of the Contract, including compliance with Minority/Women Business Enterprise as required under these contract provisions. The contractor receiving the award of the Contract shall be required to obtain from each of its subcontractors a copy of its bidder's certification and submit it to the contracting agency prior to the award of such subcontract, regardless of tier, that it will comply with the minority workforce ratio and specific affirmative action steps contained in these EEO/AA contract provisions.

**Date:** \_\_\_\_\_

\_\_\_\_\_  
Name of General Bidder

**By:**  
\_\_\_\_\_

Name and Title of Person Signing Bond

\_\_\_\_\_  
Business Address

**FORM A**

**CERTIFICATE OF NON-COLLUSION**

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

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Authorized Name

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Authorized Signature Date

---

Social Security Number or Federal Identification Number

---

Legal Name of Business Entity

---

Address

---

City, State, Zip Code

Corporate Seal (If applicable)



**FORM B**

**CERTIFICATE OF FOREIGN CORPORATION**

The undersigned certifies that it has been duly established, organized, or chartered as a corporation under the laws of:

\_\_\_\_\_

Jurisdiction

The undersigned further certifies that it complies with the requirements of M.G.L, c. 30, sec. 39L and with the requirements of M.G.L, c. 181 relative to the registration and operation of foreign corporations within the Commonwealth of Massachusetts.

\_\_\_\_\_  
Name of Person Signing the Bid or Proposal Date

\_\_\_\_\_  
Signature of Person Signing the Bid or Proposal Date

\_\_\_\_\_  
Name of Business (Print or Type)

Corporate Seal (If applicable)

**FORM C**

**COMMONWEALTH OF MASSACHUSETTS**

**SCHEDULE FOR PARTICIPATION BY WOMEN/MINORITY BUSINESS ENTERPRISE**

**BIDDER CERTIFICATION**

A bidder agrees to expend at least the amount of the contract set forth below if awarded, for W/MNE. For the purposes of this commitment, the designation means a business that has been certified by SOMWBA as such. The Bidder must indicate the W/MBE it intends to utilize in this document as follows: (Attach another sheet if necessary.)

Company Name and Address	Nature of Participant	Dollar Value of Participation
<hr/>		
1.		\$ _____
2.		\$ _____
3.		\$ _____

The undersigned hereby certifies that he or she read the terms of this condition and is authorized to bind the Bidder to the commitment herein set forth.

\_\_\_\_\_  
Name of Person Signing the Bid or Proposal

\_\_\_\_\_  
Signature of Person Signing the Bid or Proposal

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Business (Print or Type)

Corporate Seal (If applicable)

**FORMD**

**BIDDER CERTIFICATION REGARDING PAYMENT OF PREVAILING WAGES**

The undersigned hereby certifies, under pains and penalties of perjury, that the foregoing bid is based upon the payment to laborers to be employed on the project of wages in an amount no less than the applicable wage rates established for the project by the Massachusetts Department of Labor and Industries. The undersigned bidder agrees to identify the awarding authority for, from, and against any loss, expense, damages, action, or claims, including any expense incurred in connection with any delay or stoppage of the project work, arising out of or as a result of (1) the failure of the said bid to be based upon the payment of the said applicable prevailing wage rates or (2) the failure of the bidder, if selected as the contractor, to pay laborers employed on the project the said applying prevailing wage rates.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of Person Signing the Bid or Proposal

\_\_\_\_\_  
Signature of Person Signing the Bid or Proposal

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Business (Print or Type)

Corporate Seal (If applicable)

**FORM E**

**CERTIFICATION OF PAYMENT OF STATE TAXES**

Legislation enacted by the Commonwealth of Massachusetts, effective, 1983, requires that attestation below be signed:

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

**APPROVAL OF A CONTRACT OR ANY OTHER AGREEMENT WILL NOT BE GRANTED UNLESS THIS CERTIFICATION CLAUSE IS SIGNED BY AN AUTHORIZED CORPORATE OFFICER.**

**THE TAX PAYER IDENTIFICATION NUMBER WILL BE FURNISHED TO THE MASSACHUSETTS DEPARTMENT OF REVENUE TO DETERMINE IF TAX FILINGS AND/OR TAX PAYMENT OBLIGATIONS HAVE BEEN MET. PROVIDERS WHO FAIL TO CORRECT THEIR NON-FILING AND/OR DELIQUENCY STATUS SHALL NOT HAVE A CONTRACT OR ANY OTHER AGREEMENT ISSUED, RENEWED OR EXTENDED**

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(Signature of Individual)

Title

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Social Security Number or Federal Identification Number

---

Corporate Name

---

Name of Person Signing the Proposal

Date

---

Legal Name of Business Entity

---

Business Address

Corporate Seal (If applicable)

**FORM F**

**CERTIFICATION OF AUTHORITY  
MEETING OF BOARD OF  
DIRECTORS**

(Note: if business entity is a partnership or individual, all owners shall sign this form.)

At a meeting of the Directors of the \_\_\_\_\_ duly called and held at

(Corporation)

\_\_\_\_\_ on the \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_,  
(Location)

at which a quorum was present and acting, it was voted that \_\_\_\_\_, the  
(Name)

\_\_\_\_\_ of this Corporation, is hereby authorized and empowered to make,  
(Title/Position)

into, sign, seal and deliver on behalf of the Corporation a Contract for \_\_\_\_\_  
with the \_\_\_\_\_, and the performance and payment  
bonds each in the amount as specified by the Owner.

I hereby certify that the above is a true and correct copy of the record, that said vote has not been amended or repealed and is in full force, and effect as of this date and that

\_\_\_\_\_ is duly elected \_\_\_\_\_ of the corporation  
(Name) (Title/Position)

\_\_\_\_\_  
Clerk or secretary of the Corporation Date

(Note: If the Bidder is a corporation, affix corporate seal and give below the names of its president, treasurer, and general manager, if any: if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.)

the required names and addresses of all person interested in this proposal, as Principals, are as follows:

\_\_\_\_\_

**CONTRACT FOR WELLINGTON PARK & MILL CORRIDOR REVITALIZATION: PHASE 3 PROJECT AGREEMENT**

THIS AGREEMENT, made as of this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, by and between the TOWN OF ARLINGTON, MASSACHUSETTS, acting through its TOWN

MANAGER, hereinafter called the 'Owner' and \_\_\_\_\_,,  
(Name of Contractor)  
of \_\_\_\_\_, country of \_\_\_\_\_ and  
State of \_\_\_\_\_, hereinafter called the 'Contractor'.

WITNESSETH; That the Contractor and the Owner for the consideration hereinafter named agrees as follow:

1. SCOPE: The Contractor will furnish at his own proper cost and expense all materials, supplies, machinery, equipment, appliances, tools, superintendence, labor, insurance and other items and services necessary to complete the work as shown and described on the Contract Documents entitled "Wellington Park & Mill Brook Corridor Revitalization Project: Phase 3", Arlington, Massachusetts, hereinafter called the 'Project', prepared by Hatch Associates Consultants, Inc., hereinafter called the 'Designer', or 'Landscape Architect'.
2. CONTRACT SUM: The owner agrees to pay the contractor, and the contractor agrees to accept in full consideration for the performance of the contract, subject to additions and deductions provided for in the contract documents, in current funds, the sum of dollars (\$ \_\_\_\_\_), hereinafter called the 'Contract Sum' and to make payments on account thereof, as described below and elsewhere in the Contract Documents.
3. COMMENCEMENT OF WORK AND TIME OF COMPLETION: The contractor agrees to commence work on the contract within seven (7) calendar days from the receipt of written Notice to Proceed issued by the Owner and/or within fourteen (14) calendar days after execution of the contract Agreement and to thereafter diligently and continuously carry on the work. He agrees to complete the work on or before September 30, 2021 except as herein noted.
4. LIQUIDATED DAMAGES: The Contractor agrees to pay the Owner liquidated damages for failure to complete the Project in conformance with the time allowances as set forth above at the rate of \$100.00 per calendar day.
5. ALTERNATES: Not Applicable.
6. PAYMENTS TO CONTRACTOR: Payments shall be made in accordance with Chapter 30, Section 39K of the General Laws of the Commonwealth of Massachusetts, including all current amendments, generally as follows:
  - A. Within fifteen days after receipt from the Contractor, at the place designated by the Owner if such a place is so designated, of a period estimate requesting payment of the amount due for the preceding month, the Owner will make a periodic payment to the Contractor for the work performed during the preceding month and for the - materials not incorporated in the work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the Contractor has title or to which pa subcontractor has title and has authorized to Contractor to transfer title to the Owner, less (1) a retention based on its estimate of the fair value of its claims against the Contractor and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of Section 39F, and less (3) a retention not exceeding five percent of the approved amount of the periodic payment. After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the Contractor fully completes the work or substantially completes the work so that the value of the work remaining to be done is, in the estimate of the Owner, less than one percent of the original contract price, or (b)

the Contractor substantially completes the work and the Owner takes possession for occupancy, whichever occurs first, the Owner shall pay the Contractor the entire balance due on the Contract less (1) a retention based on its estimate of the fair value of its claim against the Contractor and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to subcontractors based on the demands for same in accordance with the provisions of Section 39F, or based on the record of payments by the Contractor to the subcontractors under this contract if such record of payment indicates that the Contractor has not paid subcontractors as provided in Section 39F. If the Owner fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of five percent per annum commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the Contractor, provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for Final Payment until fifteen days after receipt of such a periodic estimate from the Contractor, at the place designated by the Owner if such a place is so designated. The Contractor agrees to pay to each subcontractor a portion of any such interest paid in accordance with the amount due each subcontractor.

- B. The Owner may make changes in any periodic estimate submitted by the Contractor and the payment due on said periodic estimate shall be computed in accordance with the changes so made, but such changes or any requirement for a corrected periodic estimate shall not affect the due date for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment computed in accordance with the changes made, as provided herein; provided that the Owner may, within seven days after receipt, return to the Contractor for correction any periodic estimate which is not in the required form or which contains computations not arithmetically correct and, in that event, the date of receipt for such periodic estimate in proper form and with arithmetically correct computations. The date of receipt of a periodic estimate received on a Saturday shall be the first working day thereafter. The provisions of Section 39G shall not apply to any contract for the construction, reconstruction, remodeling, repair or demolition of any public building to which this section applies.

7. **PAYMENTS TO SUBCONTRACTORS:** Payments shall be made in accordance with Chapter 30, Section 39F of the General Laws of the Commonwealth of Massachusetts, including all current amendments, generally as follows:

- A. Forthwith after the General Contractor receives payment on account of a period estimate, the General Contractor shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the General Contractor.
- B. Not later than the sixty-fifth day after each Subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the Subcontract less amounts retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the Subcontractor, and the Owner shall pay that amount to the General Contractor. The General Contractor shall forthwith pay to the Subcontractor the full amount received from the Owner less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the General Contractor.
- C. Each payment made by the Owner to the General Contractor pursuant to subparagraphs (A) and (B) of this paragraph for the labor performed and the materials furnished by a Subcontractor shall be made to the General Contractor for the account of that Subcontractor; and the Owner shall take reasonable steps to compel the General Contractor to make each payment to each such Subcontractor. If the Owner has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the General Contractor for payment to the Subcontractor as provided in subparagraphs (A) and (B), the Owner shall act upon demand as provided in this Section.
- D. If, within seventy days after the Subcontractor has substantially completed the Subcontract work, the Subcontractor has not received from the General Contractor the balance due under the Subcontract including any amount due for extra labor and materials furnished to the General Contractor, less any amount retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, the Subcontractor may demand direct payment of that balance from the Owner. The demand shall be by a sworn statement delivered to or sent by certified mail to the Owner, and a copy shall be delivered to or sent by certified mail to the General Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the Subcontract and also a statement of the status of completion of the Subcontract work. Any demand made after Substantial Completion of the Subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially completed the Subcontract work. Within ten days after the Subcontractor has delivered or so mailed the demand to the Owner and delivered or so mailed a copy to the General Contractor, the General Contractor may reply to the demand. The reply shall be a sworn statement delivered to or sent by certified mail to the Owner and a copy shall be delivered to or sent by certified mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the Subcontract including any amount due for extra labor and materials furnished to the General Contractor and of the amount due for each claim made by the General Contractor against the Subcontractor.
- E. Within fifteen days after receipt of the demand by the Owner, but in no event prior to the seventieth day after Substantial Completion of the Subcontract work, the Awarding Authority shall make direct payment to the Subcontractor of the balance due under the Subcontract, less any amount (i) retained by the Owner as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the General Contractor in the sworn reply: provided, that the Owner 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 in subparagraph (D); The Owner shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this



subparagraph.

- F. The Owner shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (E) in an interest-bearing joint account in the names of the General Contractor and the Subcontractor in a bank in Massachusetts; selected by the Owner and agreed upon by the General Contractor and the Subcontractor and shall notify the General Contractor and the Subcontractor of the date of deposit and the bank receiving the deposit. The bank shall pay the amount on the account, including accrued interest, as provided in an agreement between the General Contractor and the Subcontractor or as determined by decree of a court of competent jurisdiction.
- G. All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (F) shall be made out of amounts payable to the General Contractor at the time of receipt of a demand for direct payment from a Subcontractor and out of amounts later become payable to the General Contractor and in order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the Owner to the General Contractor to the extent of such payment.
- H. The Owner shall deduct from payments to a General Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (F), are sufficient to satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the Subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the General Contractor.
- I. On all contracts for building construction subject to the provisions of Sections 44A to 44L, inclusive, of Chapter 149, periodic payments for work performed by a Subcontractor shall be made to the General Contractor for payment to the Subcontractor and shall be paid to the Subcontractor forthwith after receipt thereof by the General Contractor and without any ten day waiting period as provided above, less any amount claimed by the General Contractor in a letter containing a breakdown of the claim and sent to the Subcontractor with such payment, provided that a General Contractor, who has received a periodic estimate for a periodic payment in proper form from a Subcontractor three days, Saturdays, Sundays and holidays excluded, before the due date of the General Contractor's periodic estimate for the same periodic payment period less any amount claimed by the General Contractor in a letter containing a breakdown of the claim and sent to the Subcontractor with such payment, even though the General Contractor does not submit a periodic estimate to the Owner for that payment period; and provided, further, that the Owner shall take all reasonable steps to compel the General Contractor to make payment to the Subcontractors as provided in this paragraph, and upon the written request of a Subcontractor setting forth the amount payable but not paid, a copy of which shall be sent to the General Contractor, shall make direct payment to a Subcontractor, as provided for above, which shall discharge the obligation of the Owner to the General Contractor to extent of any such payment.
- J. The Owner shall not include in any direct payment to a Subcontractor pursuant to this section any amount claimed from that Subcontractor by the General Contractor in a letter containing a breakdown of the claim and sent to the Owner within ten days after the receipt by the General Contractor of the copy of the request of the Subcontractor to the Owner for direct payment.

## 8. CONDITIONS OF EMPLOYMENT

- A. The schedule of Minimum Wage Rates and Health and Pension Fund Contributions as determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 m 27D, inclusive, AS amended, is hereby made a part of this Agreement.

- B. The Contractor shall pay to any reserve police officer employed by him in any city or town the prevailing rate of wages paid to regular police officers in such city or town.
- C. No laborer, workman, mechanic, foreman or inspector working within the Commonwealth, in the employ of the Contractor, Subcontractor or any other person doing or contracting to do the whole or a part of the work contemplated by the Contract, shall be required or permitted to work more than eight hours in any one day or forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.
- D. Every employee of the Contractor or any Subcontractor shall lodge, board and trade where and with whom he elects; and no person or his agents or employees shall be directly or indirectly required, as a condition of employment that the employee to lodge, board or trade at a particular place or with a particular person.

9. SUBCONTRACTORS

- A. The Contractor will employ the following Subcontractors on the work and will pay for the execution of his as defined in the Contract Documents; and subject to the additions and deductions provided in the subject to the additions and deductions provided in the Contract Documents, the sum shown opposite his name.

<u>Class Of Work</u>	<u>Subcontractor</u>	<u>Subcontractor Sum</u>

- B. The names of any additional Subcontractors whom the Contractor proposed to employ shall be submitted to the Designer for approval. No such Subcontractor shall be employed to whose standing or ability the Owner or the Designer has any reasonable objection.

- 10. THE CONTRACT DOCUMENTS: The General Conditions of the Contract, the Specifications and the Drawings, together with this Agreement, for the Contract, and they are as fully a part of the Contract as if hereto attached or herein repeated Drawings and Specifications titled: WELLINGTON PARK & MILL CORRIDOR REVITALIZATION PROJECT: PHASE 3
- 11. INCORPORATION OF STATUTES BY REFERENCE: If statutes of the Commonwealth of Massachusetts in any way relating to the construction, alterations, repair and installation of public works,

particularly with reference to labor and labor rates, they shall be strictly complied with by the Contractor and it is understood that all such statutes are incorporated by reference in this Contract.

- 12. It is expressly agreed that this Agreement is to be executed for and in behalf of the Owner by the members of its Select Board and any of its appoints and that such persons are acting in a representative capacity for and in behalf of Owner, and that such persons shall not incur any personal liability hereunder.

IN WITNESS whereof, inhabitants of the Town of Arlington and

\_\_\_\_\_

have caused these presents to be executed by their

\_\_\_\_\_

hereunto duly authorized the day and year first written.

TOWN OF ARLINGTON

\_\_\_\_\_  
Adam W. Chapdelaine, Town Manager

\_\_\_\_\_

\_\_\_\_\_

Certification:  
I hereby Certify that an  
appropriation in the amount of  
the Contract is available.

\_\_\_\_\_  
Town Accountant

\_\_\_\_\_  
Contractor

By: . (Title)

Approved as to Matter of Form:

\_\_\_\_\_  
Town Counsel

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**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS: That we

\_\_\_\_\_

(Name of Contractor)

a \_\_\_\_\_

(Corporation, Partnership or Individual)

hereinafter called "Principal" and

\_\_\_\_\_

(Surety)  
of \_\_\_\_\_, State of \_\_\_\_\_, hereinafter called the  
"Surety", are held and firmly bound into

THE TOWN OF ARLINGTON,  
MASSACHUSETTS (Owner)

acting through its TOWN MANAGER

ARLINGTON,  
MASSACHUSETTS (City and  
State)

hereinafter called "Owner", in the penal sum of  
\_\_\_\_\_ Dollars (\$ \_\_\_\_\_) in lawful money  
of the United states, for the payment of which sum well and truly to be made, we bind  
ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly  
by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into  
a certain contract with the Owner, dated \_\_\_\_\_ day of \_\_\_\_\_ a copy  
of which is hereto attached and made a part hereof for the construction of

\_\_\_\_\_

Arlington, Massachusetts

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all  
the undertakings, covenants, terms, conditions, and agreements of said contract during the  
original term thereof, and any extensions thereof which may be granted by, the Owner, with  
or without notice to the Surety, and if he shall satisfy all claims and demands incurred under  
such contract, and shall fully indemnify and save harmless the Owner from all costs and  
damages which it may suffer by reason of failure to do so, and shall reimburse and repay  
the Owner all outlay and expense which the Owner may incur in making good any default,  
then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation of this, Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, the parties to these present have duly executed in this Bond on the day of \_\_\_\_\_

ATTEST:

\_\_\_\_\_  
Principal

By \_\_\_\_\_  
Secretary

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

\_\_\_\_\_  
Witness as to Principal

(Seal)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

ATTEST

---

: Surety

BY \_\_\_\_\_

(Surety)

---

Secretary .

---

---

---

(Address-Zip Code)

---

Witness as to Surety

(Seal)

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---

(Address-Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

END OF DOCUMENT

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**LABOR AND MATERIALS PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS: That we

\_\_\_\_\_ (Name of Contractor)

a \_\_\_\_\_ (Corporation, Partnership of Individual)

hereinafter called "Principal" and

\_\_\_\_\_ (Surety)

of \_\_\_\_\_, State of \_\_\_\_\_, hereinafter called the "Surety", are held and firmly bound into

TOWN OF ARLINGTON,  
MASSACHUSETTS (Owner)  
acting through its TOWN MANAGER

ARLINGTON,  
MASSACHUSETTS (City and  
State)

herein called "Owner", in the penal sum of

\_\_\_\_\_, Dollars (\$) ) in  
lawful money of the United States, for the payment of which sum well and truly to be made,  
we  
bind ourselves, our heirs, executors, administrators and successors, jointly and severally,  
firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that 'Whereas, the Principal entered into a certain contract with the Owner, dated the day of \_\_\_\_\_, \_\_\_\_\_ a copy of which is hereto attached and made a part hereof for the construction of:

WELLINGTON PARK & MILL CORRIDOR REVITALIZATION PROJECT: PHASE 3 IN ARLINGTON MASSACHUSETTS.

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the Same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, the parties to these present have duly executed in this Bond on the day of \_\_\_\_\_,

ATTEST:

\_\_\_\_\_  
Principal

BY  
Secretary

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

\_\_\_\_\_  
Witness as to Principal

(Seal)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

ATTEST:

---

Surety

---

Secretary

---

(Address-Zip Code)

---

Witness as to Surety

(Seal)

---

(Address-Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

END OF DOCUMENT

CAUTION: This email originated from outside of the Town of Arlington's email system. Do not click links or open attachments unless you recognize the REAL sender (whose email address in the From: line in "< >" brackets) and you know the content is safe.

To view and print Weekly Payroll & Statement of Compliance Forms, click on [www.mass.gov/dols/pw](http://www.mass.gov/dols/pw).

PLEASE NOTE: The attached Prevailing Wage Schedule is valid for 90 days. An Awarding Authority should re-request an up to date Prevailing Wage Schedule if it has NOT opened bids or selected a contractor within 90 days of the issuance date of the attached prevailing wage schedule.

\*For MULTI-YEAR projects bid on or after 8/8/08, Awarding Authorities must request an Annual Update to this Prevailing Wage Schedule each year for the duration of the project, no later than two weeks before the anniversary date of the execution of the general contract. Annual updates are not required for projects that last LESS THAN ONE YEAR.

\*For CM AT RISK projects (bid pursuant to GL c.149A), Awarding Authorities must request a Prevailing Wage Schedule NOT sooner than 90-days before the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work.

\*For MULTI-YEAR CM AT RISK projects, Awarding Authorities must request an Annual Update to this Prevailing Wage Schedule each year for the duration of the project, no later than two weeks before the anniversary date, which is the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to procure construction scopes of work.

Apprentice wages (expressed as dollar figures) and the required benefits are listed on the Prevailing Wage Schedule. For further details, please see opinion letter PW-2010-03-03.16.10 (dated March 18, 2010) at [www.mass.gov/dols/pw](http://www.mass.gov/dols/pw).

Request Prevailing Wage Rates online at: [www.mass.gov/dols/pw](http://www.mass.gov/dols/pw).

THIS IS A SYSTEM-GENERATED EMAIL. PLEASE DO NOT REPLY TO THIS EMAIL. TO CONTACT DLS REGARDING PREVAILING WAGE MATTERS, CALL 617-626-6953.

=====

APPROVAL/DENIAL COMMENTS



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

ROSALIN ACOSTA  
Secretary  
MICHAEL FLANAGAN  
Director

**Awarding Authority:** Town of Arlington  
**Contract Number:** 21-21 **City/Town:** ARLINGTON  
**Description of Work:** Wellington Park & Mill Brook Corridor Revitalization Project/Phase 3 - Includes Bioretention Basin, asphalt pathways, new boardwalk, plantings and site amenities.  
**Job Location:** Grove Street

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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 criminal penalties.
-

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Construction</b>						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2020	\$36.25	\$12.91	\$14.82	\$0.00	\$63.98
	06/01/2021	\$37.05	\$12.91	\$14.82	\$0.00	\$64.78
	08/01/2021	\$37.05	\$13.41	\$14.82	\$0.00	\$65.28
	12/01/2021	\$37.05	\$13.41	\$16.01	\$0.00	\$66.47
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2020	\$36.32	\$12.91	\$14.82	\$0.00	\$64.05
	06/01/2021	\$37.12	\$12.91	\$14.82	\$0.00	\$64.85
	08/01/2021	\$37.12	\$13.41	\$14.82	\$0.00	\$65.35
	12/01/2021	\$37.12	\$13.41	\$16.01	\$0.00	\$66.54
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2020	\$36.44	\$12.91	\$14.82	\$0.00	\$64.17
	06/01/2021	\$37.24	\$12.91	\$14.82	\$0.00	\$64.97
	08/01/2021	\$37.24	\$13.41	\$14.82	\$0.00	\$65.47
	12/01/2021	\$37.24	\$13.41	\$16.01	\$0.00	\$66.66
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.65	\$8.60	\$17.32	\$0.00	\$66.57
	06/01/2021	\$41.67	\$8.60	\$17.32	\$0.00	\$67.59
	12/01/2021	\$42.68	\$8.60	\$17.32	\$0.00	\$68.60
	06/01/2022	\$43.68	\$8.60	\$17.32	\$0.00	\$69.60
	12/01/2022	\$44.68	\$8.60	\$17.32	\$0.00	\$70.60
	06/01/2023	\$45.68	\$8.60	\$17.32	\$0.00	\$71.60
	12/01/2023	\$46.93	\$8.60	\$17.32	\$0.00	\$72.85
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.65	\$8.60	\$17.32	\$0.00	\$66.57
	06/01/2021	\$41.67	\$8.60	\$17.32	\$0.00	\$67.59
	12/01/2021	\$42.68	\$8.60	\$17.32	\$0.00	\$68.60
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	12/01/2020	\$38.10	\$12.80	\$9.45	\$0.00	\$60.35
ASPHALT RAKER <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.98	\$13.50	\$15.70	\$0.00	\$79.18
	06/01/2021	\$51.08	\$13.50	\$15.70	\$0.00	\$80.28
	12/01/2021	\$52.23	\$13.50	\$15.70	\$0.00	\$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.98	\$13.50	\$15.70	\$0.00	\$79.18
	06/01/2021	\$51.08	\$13.50	\$15.70	\$0.00	\$80.28
	12/01/2021	\$52.23	\$13.50	\$15.70	\$0.00	\$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.65	\$8.60	\$17.32	\$0.00	\$66.57
	06/01/2021	\$41.67	\$8.60	\$17.32	\$0.00	\$67.59
	12/01/2021	\$42.68	\$8.60	\$17.32	\$0.00	\$68.60
	06/01/2022	\$43.68	\$8.60	\$17.32	\$0.00	\$69.60
	12/01/2022	\$44.68	\$8.60	\$17.32	\$0.00	\$70.60
	06/01/2023	\$45.68	\$8.60	\$17.32	\$0.00	\$71.60
	12/01/2023	\$46.93	\$8.60	\$17.32	\$0.00	\$72.85
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.65	\$8.60	\$17.32	\$0.00	\$66.57
	06/01/2021	\$41.67	\$8.60	\$17.32	\$0.00	\$67.59
	12/01/2021	\$42.68	\$8.60	\$17.32	\$0.00	\$68.60
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2020	\$46.10	\$7.07	\$17.98	\$0.00	\$71.15

**Apprentice - BOILERMAKER - Local 29**

**Effective Date - 01/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$29.97	\$7.07	\$11.69	\$0.00	\$48.73
2	65	\$29.97	\$7.07	\$11.69	\$0.00	\$48.73
3	70	\$32.27	\$7.07	\$12.59	\$0.00	\$51.93
4	75	\$34.58	\$7.07	\$13.49	\$0.00	\$55.14
5	80	\$36.88	\$7.07	\$14.38	\$0.00	\$58.33
6	85	\$39.19	\$7.07	\$15.29	\$0.00	\$61.55
7	90	\$41.49	\$7.07	\$16.18	\$0.00	\$64.74
8	95	\$43.80	\$7.07	\$17.09	\$0.00	\$67.96

**Notes:**

**Apprentice to Journeyworker Ratio:1:4**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) <i>BRICKLAYERS LOCAL 3 (BOSTON)</i>	02/01/2021	\$55.75	\$11.39	\$22.09	\$0.00	\$89.23
	08/01/2021	\$57.15	\$11.39	\$22.25	\$0.00	\$90.79
	02/01/2022	\$57.74	\$11.39	\$22.25	\$0.00	\$91.38

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

**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.88	\$11.39	\$22.09	\$0.00	\$61.36
2	60	\$33.45	\$11.39	\$22.09	\$0.00	\$66.93
3	70	\$39.03	\$11.39	\$22.09	\$0.00	\$72.51
4	80	\$44.60	\$10.75	\$22.09	\$0.00	\$77.44
5	90	\$50.18	\$10.75	\$22.09	\$0.00	\$83.02

**Effective Date - 08/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.58	\$11.39	\$22.25	\$0.00	\$62.22
2	60	\$34.29	\$11.39	\$22.25	\$0.00	\$67.93
3	70	\$40.01	\$11.39	\$22.25	\$0.00	\$73.65
4	80	\$45.72	\$10.75	\$22.25	\$0.00	\$78.72
5	90	\$51.44	\$10.75	\$22.25	\$0.00	\$84.44

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

BULLDOZER/GRADER/SCRAPER OPERATING ENGINEERS LOCAL 4	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

CAISSON & UNDERPINNING BOTTOM MAN LABORERS - FOUNDATION AND MARINE	12/01/2020	\$41.05	\$8.60	\$17.47	\$0.00	\$67.12
	06/01/2021	\$42.07	\$8.60	\$17.47	\$0.00	\$68.14
	12/01/2021	\$43.08	\$8.60	\$17.47	\$0.00	\$69.15

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING LABORER LABORERS - FOUNDATION AND MARINE	12/01/2020	\$39.90	\$8.60	\$17.47	\$0.00	\$65.97
	06/01/2021	\$40.92	\$8.60	\$17.47	\$0.00	\$66.99
	12/01/2021	\$41.93	\$8.60	\$17.47	\$0.00	\$68.00

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING TOP MAN LABORERS - FOUNDATION AND MARINE	12/01/2020	\$39.90	\$8.60	\$17.47	\$0.00	\$65.97
	06/01/2021	\$40.92	\$8.60	\$17.47	\$0.00	\$66.99
	12/01/2021	\$41.93	\$8.60	\$17.47	\$0.00	\$68.00

For apprentice rates see "Apprentice- LABORER"

CARBIDE CORE DRILL OPERATOR LABORERS - ZONE 1	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35

For apprentice rates see "Apprentice- LABORER"



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER	09/01/2020	\$42.94	\$9.40	\$18.95	\$0.00	\$71.29
CARPENTERS -ZONE 2 (Eastern Massachusetts)	03/01/2021	\$43.54	\$9.40	\$18.95	\$0.00	\$71.89
	09/01/2021	\$44.19	\$9.40	\$18.95	\$0.00	\$72.54
	03/01/2022	\$44.79	\$9.40	\$18.95	\$0.00	\$73.14
	09/01/2022	\$45.44	\$9.40	\$18.95	\$0.00	\$73.79
	03/01/2023	\$46.04	\$9.40	\$18.95	\$0.00	\$74.39

**Apprentice - CARPENTER - Zone 2 Eastern MA**

**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.47	\$9.40	\$1.73	\$0.00	\$32.60
2	60	\$25.76	\$9.40	\$1.73	\$0.00	\$36.89
3	70	\$30.06	\$9.40	\$13.76	\$0.00	\$53.22
4	75	\$32.21	\$9.40	\$13.76	\$0.00	\$55.37
5	80	\$34.35	\$9.40	\$15.49	\$0.00	\$59.24
6	80	\$34.35	\$9.40	\$15.49	\$0.00	\$59.24
7	90	\$38.65	\$9.40	\$17.22	\$0.00	\$65.27
8	90	\$38.65	\$9.40	\$17.22	\$0.00	\$65.27

**Effective Date - 03/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.77	\$9.40	\$1.73	\$0.00	\$32.90
2	60	\$26.12	\$9.40	\$1.73	\$0.00	\$37.25
3	70	\$30.48	\$9.40	\$13.76	\$0.00	\$53.64
4	75	\$32.66	\$9.40	\$13.76	\$0.00	\$55.82
5	80	\$34.83	\$9.40	\$15.49	\$0.00	\$59.72
6	80	\$34.83	\$9.40	\$15.49	\$0.00	\$59.72
7	90	\$39.19	\$9.40	\$17.22	\$0.00	\$65.81
8	90	\$39.19	\$9.40	\$17.22	\$0.00	\$65.81

**Notes:**

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
 Step 1&2 \$30.45/ 3&4 \$36.42/ 5&6 \$54.95/ 7&8 \$60.97

**Apprentice to Journeyworker Ratio:1:5**

CARPENTER WOOD FRAME	04/01/2020	\$22.66	\$7.21	\$4.80	\$0.00	\$34.67
CARPENTERS-ZONE 3 (Wood Frame)	04/01/2021	\$23.16	\$7.21	\$4.80	\$0.00	\$35.17
	04/01/2022	\$23.66	\$7.21	\$4.80	\$0.00	\$35.67
	04/01/2023	\$24.16	\$7.21	\$4.80	\$0.00	\$36.17

All Aspects of New Wood Frame Work

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - CARPENTER (Wood Frame) - Zone 3**

**Effective Date - 04/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$13.60	\$7.21	\$0.00	\$0.00	\$20.81
2	60	\$13.60	\$7.21	\$0.00	\$0.00	\$20.81
3	65	\$14.73	\$7.21	\$0.00	\$0.00	\$21.94
4	70	\$15.86	\$7.21	\$0.00	\$0.00	\$23.07
5	75	\$17.00	\$7.21	\$3.80	\$0.00	\$28.01
6	80	\$18.13	\$7.21	\$3.80	\$0.00	\$29.14
7	85	\$19.26	\$7.21	\$3.80	\$0.00	\$30.27
8	90	\$20.39	\$7.21	\$3.80	\$0.00	\$31.40

**Effective Date - 04/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$13.90	\$7.21	\$0.00	\$0.00	\$21.11
2	60	\$13.90	\$7.21	\$0.00	\$0.00	\$21.11
3	65	\$15.05	\$7.21	\$0.00	\$0.00	\$22.26
4	70	\$16.21	\$7.21	\$0.00	\$0.00	\$23.42
5	75	\$17.37	\$7.21	\$3.80	\$0.00	\$28.38
6	80	\$18.53	\$7.21	\$3.80	\$0.00	\$29.54
7	85	\$19.69	\$7.21	\$3.80	\$0.00	\$30.70
8	90	\$20.84	\$7.21	\$3.80	\$0.00	\$31.85

**Notes:**

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
 Step 1&2 \$17.41/ 3&4 \$19.67/ 5&6 \$26.87/ 7&8 \$29.14

**Apprentice to Journeyworker Ratio:1:5**

CEMENT MASONRY/PLASTERING BRICKLAYERS LOCAL 3 (BOSTON)	01/01/2020	\$49.07	\$12.75	\$22.41	\$0.62	\$84.85
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**Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (Boston)**

**Effective Date - 01/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.54	\$12.75	\$15.41	\$0.00	\$52.70
2	60	\$29.44	\$12.75	\$17.41	\$0.62	\$60.22
3	65	\$31.90	\$12.75	\$18.41	\$0.62	\$63.68
4	70	\$34.35	\$12.75	\$19.41	\$0.62	\$67.13
5	75	\$36.80	\$12.75	\$20.41	\$0.62	\$70.58
6	80	\$39.26	\$12.75	\$21.41	\$0.62	\$74.04
7	90	\$44.16	\$12.75	\$22.41	\$0.62	\$79.94

**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 <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$50.98	\$13.50	\$15.70	\$0.00	\$80.18
	06/01/2021	\$52.08	\$13.50	\$15.70	\$0.00	\$81.28
	12/01/2021	\$53.23	\$13.50	\$15.70	\$0.00	\$82.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$33.00	\$13.50	\$15.70	\$0.00	\$62.20
	06/01/2021	\$33.75	\$13.50	\$15.70	\$0.00	\$62.95
	12/01/2021	\$34.54	\$13.50	\$15.70	\$0.00	\$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2021	\$52.06	\$8.25	\$22.75	\$0.00	\$83.06

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.03	\$8.25	\$0.00	\$0.00	\$34.28
2	55	\$28.63	\$8.25	\$6.16	\$0.00	\$43.04
3	60	\$31.24	\$8.25	\$6.72	\$0.00	\$46.21
4	65	\$33.84	\$8.25	\$7.28	\$0.00	\$49.37
5	70	\$36.44	\$8.25	\$19.39	\$0.00	\$64.08
6	75	\$39.05	\$8.25	\$19.95	\$0.00	\$67.25
7	80	\$41.65	\$8.25	\$20.51	\$0.00	\$70.41
8	90	\$46.85	\$8.25	\$21.63	\$0.00	\$76.73

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

DEMO: ADZEMAN <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.05	\$8.60	\$17.32	\$0.00	\$65.97
	06/01/2021	\$41.07	\$8.60	\$17.32	\$0.00	\$66.99
	12/01/2021	\$42.08	\$8.60	\$17.32	\$0.00	\$68.00
	06/01/2022	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	12/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	06/01/2023	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	12/01/2023	\$46.33	\$8.60	\$17.32	\$0.00	\$72.25

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BACKHOE/LOADER/HAMMER OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2020	\$41.05	\$8.60	\$17.32	\$0.00	\$66.97
	06/01/2021	\$42.07	\$8.60	\$17.32	\$0.00	\$67.99
	12/01/2021	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	06/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	12/01/2022	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	06/01/2023	\$46.08	\$8.60	\$17.32	\$0.00	\$72.00
	12/01/2023	\$47.33	\$8.60	\$17.32	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.80	\$8.60	\$17.32	\$0.00	\$66.72
	06/01/2021	\$41.82	\$8.60	\$17.32	\$0.00	\$67.74
	12/01/2021	\$42.83	\$8.60	\$17.32	\$0.00	\$68.75
	06/01/2022	\$43.83	\$8.60	\$17.32	\$0.00	\$69.75
	12/01/2022	\$44.83	\$8.60	\$17.32	\$0.00	\$70.75
	06/01/2023	\$45.83	\$8.60	\$17.32	\$0.00	\$71.75
	12/01/2023	\$47.08	\$8.60	\$17.32	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER <i>LABORERS - ZONE 1</i>	12/01/2020	\$41.05	\$8.60	\$17.32	\$0.00	\$66.97
	06/01/2021	\$42.07	\$8.60	\$17.32	\$0.00	\$67.99
	12/01/2021	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	06/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	12/01/2022	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	06/01/2023	\$46.08	\$8.60	\$17.32	\$0.00	\$72.00
	12/01/2023	\$47.33	\$8.60	\$17.32	\$0.00	\$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.80	\$8.60	\$17.32	\$0.00	\$66.72
	06/01/2021	\$41.82	\$8.60	\$17.32	\$0.00	\$67.74
	12/01/2021	\$42.83	\$8.60	\$17.32	\$0.00	\$68.75
	06/01/2022	\$43.83	\$8.60	\$17.32	\$0.00	\$69.75
	12/01/2022	\$44.83	\$8.60	\$17.32	\$0.00	\$70.75
	06/01/2023	\$45.83	\$8.60	\$17.32	\$0.00	\$71.75
	12/01/2023	\$47.08	\$8.60	\$17.32	\$0.00	\$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.05	\$8.60	\$17.32	\$0.00	\$65.97
	06/01/2021	\$41.07	\$8.60	\$17.32	\$0.00	\$66.99
	12/01/2021	\$42.08	\$8.60	\$17.32	\$0.00	\$68.00
	06/01/2022	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	12/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	06/01/2023	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	12/01/2023	\$46.33	\$8.60	\$17.32	\$0.00	\$72.25
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$68.70	\$9.40	\$23.12	\$0.00	\$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						

<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$73.60	\$9.40	\$23.12	\$0.00	\$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i>	07/01/2020	\$26.77	\$6.67	\$3.93	\$0.16	\$37.53
ELECTRICIAN <i>ELECTRICIANS LOCAL 103</i>	09/01/2020	\$54.45	\$13.00	\$19.73	\$0.00	\$87.18
	03/01/2021	\$55.41	\$13.00	\$20.01	\$0.00	\$88.42
	09/01/2021	\$56.84	\$13.00	\$20.06	\$0.00	\$89.90
	03/01/2022	\$58.04	\$13.00	\$20.09	\$0.00	\$91.13
	09/01/2022	\$59.48	\$13.00	\$20.13	\$0.00	\$92.61
	03/01/2023	\$60.67	\$13.00	\$20.17	\$0.00	\$93.84

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - ELECTRICIAN - Local 103**

**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$21.78	\$13.00	\$0.65	\$0.00	\$35.43
2	40	\$21.78	\$13.00	\$0.65	\$0.00	\$35.43
3	45	\$24.50	\$13.00	\$14.87	\$0.00	\$52.37
4	45	\$24.50	\$13.00	\$14.87	\$0.00	\$52.37
5	50	\$27.23	\$13.00	\$15.31	\$0.00	\$55.54
6	55	\$29.95	\$13.00	\$15.75	\$0.00	\$58.70
7	60	\$32.67	\$13.00	\$16.19	\$0.00	\$61.86
8	65	\$35.39	\$13.00	\$16.63	\$0.00	\$65.02
9	70	\$38.12	\$13.00	\$17.07	\$0.00	\$68.19
10	75	\$40.84	\$13.00	\$17.53	\$0.00	\$71.37

**Effective Date - 03/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$22.16	\$13.00	\$0.66	\$0.00	\$35.82
2	40	\$22.16	\$13.00	\$0.66	\$0.00	\$35.82
3	45	\$24.93	\$13.00	\$15.13	\$0.00	\$53.06
4	45	\$24.93	\$13.00	\$15.13	\$0.00	\$53.06
5	50	\$27.71	\$13.00	\$15.57	\$0.00	\$56.28
6	55	\$30.48	\$13.00	\$16.01	\$0.00	\$59.49
7	60	\$33.25	\$13.00	\$16.46	\$0.00	\$62.71
8	65	\$36.02	\$13.00	\$16.90	\$0.00	\$65.92
9	70	\$38.79	\$13.00	\$17.34	\$0.00	\$69.13
10	75	\$41.56	\$13.00	\$17.80	\$0.00	\$72.36

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

**Apprentice to Journeyworker Ratio:2:3\*\*\***

ELEVATOR CONSTRUCTOR	01/01/2021	\$63.47	\$15.88	\$19.31	\$0.00	\$98.66
ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2022	\$65.62	\$16.03	\$20.21	\$0.00	\$101.86

**Apprentice - ELEVATOR CONSTRUCTOR - Local 4**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.74	\$15.88	\$0.00	\$0.00	\$47.62
2	55	\$34.91	\$15.88	\$19.31	\$0.00	\$70.10
3	65	\$41.26	\$15.88	\$19.31	\$0.00	\$76.45
4	70	\$44.43	\$15.88	\$19.31	\$0.00	\$79.62
5	80	\$50.78	\$15.88	\$19.31	\$0.00	\$85.97

**Effective Date - 01/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.81	\$16.03	\$0.00	\$0.00	\$48.84
2	55	\$36.09	\$16.03	\$20.21	\$0.00	\$72.33
3	65	\$42.65	\$16.03	\$20.21	\$0.00	\$78.89
4	70	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
5	80	\$52.50	\$16.03	\$20.21	\$0.00	\$88.74

**Notes:**

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

**Apprentice to Journeyworker Ratio:1:1**

ELEVATOR CONSTRUCTOR HELPER	01/01/2021	\$44.43	\$15.88	\$19.31	\$0.00	\$79.62
ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
LABORERS - ZONE 1	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35

For apprentice rates see "Apprentice- LABORER"

FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY)	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
LABORERS - ZONE 1 (HEAVY & HIGHWAY)	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY	11/01/2020	\$45.23	\$13.00	\$15.70	\$0.00	\$73.93
OPERATING ENGINEERS LOCAL 4	05/01/2021	\$46.38	\$13.00	\$15.70	\$0.00	\$75.08
	11/01/2021	\$47.38	\$13.00	\$15.70	\$0.00	\$76.08
	05/01/2022	\$48.53	\$13.00	\$15.70	\$0.00	\$77.23

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY	11/01/2020	\$46.74	\$13.00	\$15.70	\$0.00	\$75.44
OPERATING ENGINEERS LOCAL 4	05/01/2021	\$47.90	\$13.00	\$15.70	\$0.00	\$76.60
	11/01/2021	\$48.91	\$13.00	\$15.70	\$0.00	\$77.61
	05/01/2022	\$50.07	\$13.00	\$15.70	\$0.00	\$78.77

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2020	\$22.73	\$13.00	\$15.70	\$0.00	\$51.43
	05/01/2021	\$23.41	\$13.00	\$15.70	\$0.00	\$52.11
	11/01/2021	\$24.01	\$13.00	\$15.70	\$0.00	\$52.71
	05/01/2022	\$24.68	\$13.00	\$15.70	\$0.00	\$53.38
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 103</i>	09/01/2020	\$54.45	\$13.00	\$19.73	\$0.00	\$87.18
	03/01/2021	\$55.41	\$13.00	\$20.01	\$0.00	\$88.42
	09/01/2021	\$56.84	\$13.00	\$20.06	\$0.00	\$89.90
	03/01/2022	\$58.04	\$13.00	\$20.09	\$0.00	\$91.13
	09/01/2022	\$59.48	\$13.00	\$20.13	\$0.00	\$92.61
	03/01/2023	\$60.67	\$13.00	\$20.17	\$0.00	\$93.84
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS LOCAL 103</i>	09/01/2020	\$40.84	\$13.00	\$17.53	\$0.00	\$71.37
	03/01/2021	\$42.11	\$13.00	\$17.88	\$0.00	\$72.99
	09/01/2021	\$43.77	\$13.00	\$18.00	\$0.00	\$74.77
	03/01/2022	\$45.27	\$13.00	\$18.12	\$0.00	\$76.39
	09/01/2022	\$46.99	\$13.00	\$18.24	\$0.00	\$78.23
	03/01/2023	\$48.54	\$13.00	\$18.37	\$0.00	\$79.91
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$40.75	\$13.50	\$15.70	\$0.00	\$69.95
	06/01/2021	\$41.66	\$13.50	\$15.70	\$0.00	\$70.86
	12/01/2021	\$42.61	\$13.50	\$15.70	\$0.00	\$71.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$24.50	\$8.60	\$17.32	\$0.00	\$50.42
	06/01/2021	\$24.50	\$8.60	\$17.32	\$0.00	\$50.42
	12/01/2021	\$24.50	\$8.60	\$17.32	\$0.00	\$50.42
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE 1</i>	09/01/2020	\$47.79	\$9.40	\$19.25	\$0.00	\$76.44
	03/01/2021	\$48.59	\$9.40	\$19.25	\$0.00	\$77.24
	09/01/2021	\$49.39	\$9.40	\$19.25	\$0.00	\$78.04
	03/01/2022	\$50.19	\$9.40	\$19.25	\$0.00	\$78.84



**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - FLOORCOVERER - Local 2168 Zone I**

**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.90	\$9.40	\$1.79	\$0.00	\$35.09
2	55	\$26.28	\$9.40	\$1.79	\$0.00	\$37.47
3	60	\$28.67	\$9.40	\$13.88	\$0.00	\$51.95
4	65	\$31.06	\$9.40	\$13.88	\$0.00	\$54.34
5	70	\$33.45	\$9.40	\$15.67	\$0.00	\$58.52
6	75	\$35.84	\$9.40	\$15.67	\$0.00	\$60.91
7	80	\$38.23	\$9.40	\$17.46	\$0.00	\$65.09
8	85	\$40.62	\$9.40	\$17.46	\$0.00	\$67.48

**Effective Date - 03/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.30	\$9.40	\$1.79	\$0.00	\$35.49
2	55	\$26.72	\$9.40	\$1.79	\$0.00	\$37.91
3	60	\$29.15	\$9.40	\$13.88	\$0.00	\$52.43
4	65	\$31.58	\$9.40	\$13.88	\$0.00	\$54.86
5	70	\$34.01	\$9.40	\$15.67	\$0.00	\$59.08
6	75	\$36.44	\$9.40	\$15.67	\$0.00	\$61.51
7	80	\$38.87	\$9.40	\$17.46	\$0.00	\$65.73
8	85	\$41.30	\$9.40	\$17.46	\$0.00	\$68.16

**Notes:** Steps are 750 hrs.  
 % After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)  
 Step 1&2 \$32.70/ 3&4 \$39.20/ 5&6 \$58.52/ 7&8 \$65.09

**Apprentice to Journeyworker Ratio:1:1**

FORK LIFT/CHERRY PICKER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.98	\$13.50	\$15.70	\$0.00	\$79.18
	06/01/2021	\$51.08	\$13.50	\$15.70	\$0.00	\$80.28
	12/01/2021	\$52.23	\$13.50	\$15.70	\$0.00	\$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$33.00	\$13.50	\$15.70	\$0.00	\$62.20
	06/01/2021	\$33.75	\$13.50	\$15.70	\$0.00	\$62.95
	12/01/2021	\$34.54	\$13.50	\$15.70	\$0.00	\$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) <i>GLAZIERS LOCAL 35 (ZONE 2)</i>	01/01/2021	\$41.56	\$8.25	\$22.75	\$0.00	\$72.56

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - GLAZIER - Local 35 Zone 2**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.78	\$8.25	\$0.00	\$0.00	\$29.03
2	55	\$22.86	\$8.25	\$6.16	\$0.00	\$37.27
3	60	\$24.94	\$8.25	\$6.72	\$0.00	\$39.91
4	65	\$27.01	\$8.25	\$7.28	\$0.00	\$42.54
5	70	\$29.09	\$8.25	\$19.39	\$0.00	\$56.73
6	75	\$31.17	\$8.25	\$19.95	\$0.00	\$59.37
7	80	\$33.25	\$8.25	\$20.51	\$0.00	\$62.01
8	90	\$37.40	\$8.25	\$21.63	\$0.00	\$67.28

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

HOISTING ENGINEER/CRANES/GRADALLS	12/01/2020	\$49.98	\$13.50	\$15.70	\$0.00	\$79.18
OPERATING ENGINEERS LOCAL 4	06/01/2021	\$51.08	\$13.50	\$15.70	\$0.00	\$80.28
	12/01/2021	\$52.23	\$13.50	\$15.70	\$0.00	\$81.43

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - OPERATING ENGINEERS - Local 4**

**Effective Date - 12/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$27.49	\$13.50	\$0.00	\$0.00	\$40.99
2	60	\$29.99	\$13.50	\$15.70	\$0.00	\$59.19
3	65	\$32.49	\$13.50	\$15.70	\$0.00	\$61.69
4	70	\$34.99	\$13.50	\$15.70	\$0.00	\$64.19
5	75	\$37.49	\$13.50	\$15.70	\$0.00	\$66.69
6	80	\$39.98	\$13.50	\$15.70	\$0.00	\$69.18
7	85	\$42.48	\$13.50	\$15.70	\$0.00	\$71.68
8	90	\$44.98	\$13.50	\$15.70	\$0.00	\$74.18

**Effective Date - 06/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$28.09	\$13.50	\$0.00	\$0.00	\$41.59
2	60	\$30.65	\$13.50	\$15.70	\$0.00	\$59.85
3	65	\$33.20	\$13.50	\$15.70	\$0.00	\$62.40
4	70	\$35.76	\$13.50	\$15.70	\$0.00	\$64.96
5	75	\$38.31	\$13.50	\$15.70	\$0.00	\$67.51
6	80	\$40.86	\$13.50	\$15.70	\$0.00	\$70.06
7	85	\$43.42	\$13.50	\$15.70	\$0.00	\$72.62
8	90	\$45.97	\$13.50	\$15.70	\$0.00	\$75.17

**Notes:**

**Apprentice to Journeyworker Ratio:1:6**

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - A	02/01/2021	\$51.67	\$13.65	\$24.57	\$2.70	\$92.59
	08/01/2021	\$53.42	\$13.65	\$24.57	\$2.75	\$94.39
	02/01/2022	\$55.17	\$13.65	\$24.57	\$2.80	\$96.19

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 103	09/01/2020	\$54.45	\$13.00	\$19.73	\$0.00	\$87.18
	03/01/2021	\$55.41	\$13.00	\$20.01	\$0.00	\$88.42
	09/01/2021	\$56.84	\$13.00	\$20.06	\$0.00	\$89.90
	03/01/2022	\$58.04	\$13.00	\$20.09	\$0.00	\$91.13
	09/01/2022	\$59.48	\$13.00	\$20.13	\$0.00	\$92.61
	03/01/2023	\$60.67	\$13.00	\$20.17	\$0.00	\$93.84

For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - A	02/01/2021	\$51.67	\$13.65	\$24.57	\$2.70	\$92.59
	08/01/2021	\$53.42	\$13.65	\$24.57	\$2.75	\$94.39
	02/01/2022	\$55.17	\$13.65	\$24.57	\$2.80	\$96.19

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (TESTING AND BALANCING -WATER) PIPEFITTERS LOCAL 537	09/01/2020	\$56.44	\$11.70	\$20.24	\$0.00	\$88.38
	03/01/2021	\$57.94	\$11.70	\$20.24	\$0.00	\$89.88

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC MECHANIC <i>PIPEFITTERS LOCAL 537</i>	09/01/2020	\$56.44	\$11.70	\$20.24	\$0.00	\$88.38
	03/01/2021	\$57.94	\$11.70	\$20.24	\$0.00	\$89.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.65	\$8.60	\$17.32	\$0.00	\$66.57
	06/01/2021	\$41.67	\$8.60	\$17.32	\$0.00	\$67.59
	12/01/2021	\$42.68	\$8.60	\$17.32	\$0.00	\$68.60
	06/01/2022	\$43.68	\$8.60	\$17.32	\$0.00	\$69.60
	12/01/2022	\$44.68	\$8.60	\$17.32	\$0.00	\$70.60
	06/01/2023	\$45.68	\$8.60	\$17.32	\$0.00	\$71.60
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.65	\$8.60	\$17.32	\$0.00	\$66.57
	06/01/2021	\$41.67	\$8.60	\$17.32	\$0.00	\$67.59
	12/01/2021	\$42.68	\$8.60	\$17.32	\$0.00	\$68.60
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2020	\$49.00	\$13.80	\$17.14	\$0.00	\$79.94
	09/01/2021	\$51.40	\$13.80	\$17.14	\$0.00	\$82.34
	09/01/2022	\$53.85	\$13.80	\$17.14	\$0.00	\$84.79

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

**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.50	\$13.80	\$12.42	\$0.00	\$50.72
2	60	\$29.40	\$13.80	\$13.36	\$0.00	\$56.56
3	70	\$34.30	\$13.80	\$14.31	\$0.00	\$62.41
4	80	\$39.20	\$13.80	\$15.25	\$0.00	\$68.25

**Effective Date - 09/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.70	\$13.80	\$12.42	\$0.00	\$51.92
2	60	\$30.84	\$13.80	\$13.36	\$0.00	\$58.00
3	70	\$35.98	\$13.80	\$14.31	\$0.00	\$64.09
4	80	\$41.12	\$13.80	\$15.25	\$0.00	\$70.17

**Notes:**

Steps are 1 year

**Apprentice to Journeyworker Ratio:1:4**

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (BOSTON AREA)</i>	09/16/2020	\$48.66	\$8.10	\$25.10	\$0.00	\$81.86
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**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - IRONWORKER - Local 7 Boston**

**Effective Date - 09/16/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$29.20	\$8.10	\$25.10	\$0.00	\$62.40
2	70	\$34.06	\$8.10	\$25.10	\$0.00	\$67.26
3	75	\$36.50	\$8.10	\$25.10	\$0.00	\$69.70
4	80	\$38.93	\$8.10	\$25.10	\$0.00	\$72.13
5	85	\$41.36	\$8.10	\$25.10	\$0.00	\$74.56
6	90	\$43.79	\$8.10	\$25.10	\$0.00	\$76.99

**Notes:**

\*\* Structural 1:6; Ornamental 1:4

**Apprentice to Journeyworker Ratio:\*\***

<b>JACKHAMMER &amp; PAVING BREAKER OPERATOR</b>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
<i>LABORERS - ZONE 1</i>	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35

For apprentice rates see "Apprentice- LABORER"

<b>LABORER</b>	12/01/2020	\$39.90	\$8.60	\$17.32	\$0.00	\$65.82
<i>LABORERS - ZONE 1</i>	06/01/2021	\$40.92	\$8.60	\$17.32	\$0.00	\$66.84
	12/01/2021	\$41.93	\$8.60	\$17.32	\$0.00	\$67.85
	06/01/2022	\$42.93	\$8.60	\$17.32	\$0.00	\$68.85
	12/01/2022	\$43.93	\$8.60	\$17.32	\$0.00	\$69.85
	06/01/2023	\$44.93	\$8.60	\$17.32	\$0.00	\$70.85
	12/01/2023	\$46.18	\$8.60	\$17.32	\$0.00	\$72.10

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - LABORER - Zone 1**

**Effective Date - 12/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$23.94	\$8.60	\$17.32	\$0.00	\$49.86
2	70	\$27.93	\$8.60	\$17.32	\$0.00	\$53.85
3	80	\$31.92	\$8.60	\$17.32	\$0.00	\$57.84
4	90	\$35.91	\$8.60	\$17.32	\$0.00	\$61.83

**Effective Date - 06/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$24.55	\$8.60	\$17.32	\$0.00	\$50.47
2	70	\$28.64	\$8.60	\$17.32	\$0.00	\$54.56
3	80	\$32.74	\$8.60	\$17.32	\$0.00	\$58.66
4	90	\$36.83	\$8.60	\$17.32	\$0.00	\$62.75

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

LABORER (HEAVY & HIGHWAY)	12/01/2020	\$39.90	\$8.60	\$17.32	\$0.00	\$65.82
LABORERS - ZONE 1 (HEAVY & HIGHWAY)	06/01/2021	\$40.92	\$8.60	\$17.32	\$0.00	\$66.84
	12/01/2021	\$41.93	\$8.60	\$17.32	\$0.00	\$67.85

**Apprentice - LABORER (Heavy & Highway) - Zone 1**

**Effective Date - 12/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$23.94	\$8.60	\$17.32	\$0.00	\$49.86
2	70	\$27.93	\$8.60	\$17.32	\$0.00	\$53.85
3	80	\$31.92	\$8.60	\$17.32	\$0.00	\$57.84
4	90	\$35.91	\$8.60	\$17.32	\$0.00	\$61.83

**Effective Date - 06/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$24.55	\$8.60	\$17.32	\$0.00	\$50.47
2	70	\$28.64	\$8.60	\$17.32	\$0.00	\$54.56
3	80	\$32.74	\$8.60	\$17.32	\$0.00	\$58.66
4	90	\$36.83	\$8.60	\$17.32	\$0.00	\$62.75

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER <i>LABORERS - ZONE 1</i>	12/01/2020	\$39.90	\$8.60	\$17.32	\$0.00	\$65.82
	06/01/2021	\$40.92	\$8.60	\$17.32	\$0.00	\$66.84
	12/01/2021	\$41.93	\$8.60	\$17.32	\$0.00	\$67.85
	06/01/2022	\$42.93	\$8.60	\$17.32	\$0.00	\$68.85
	12/01/2022	\$43.93	\$8.60	\$17.32	\$0.00	\$69.85
	06/01/2023	\$44.93	\$8.60	\$17.32	\$0.00	\$70.85
	12/01/2023	\$46.18	\$8.60	\$17.32	\$0.00	\$72.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER <i>LABORERS - ZONE 1</i>	12/01/2020	\$39.90	\$8.60	\$17.32	\$0.00	\$65.82
	06/01/2021	\$40.92	\$8.60	\$17.32	\$0.00	\$66.84
	12/01/2021	\$41.93	\$8.60	\$17.32	\$0.00	\$67.85
	06/01/2022	\$42.93	\$8.60	\$17.32	\$0.00	\$68.85
	12/01/2022	\$43.93	\$8.60	\$17.32	\$0.00	\$69.85
	06/01/2023	\$44.93	\$8.60	\$17.32	\$0.00	\$70.85
	12/01/2023	\$46.18	\$8.60	\$17.32	\$0.00	\$72.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.05	\$8.60	\$17.32	\$0.00	\$65.97
	06/01/2021	\$41.07	\$8.60	\$17.32	\$0.00	\$66.99
	12/01/2021	\$42.08	\$8.60	\$17.32	\$0.00	\$68.00
	06/01/2022	\$43.08	\$8.60	\$17.32	\$0.00	\$69.00
	12/01/2022	\$44.08	\$8.60	\$17.32	\$0.00	\$70.00
	06/01/2023	\$45.08	\$8.60	\$17.32	\$0.00	\$71.00
	12/01/2023	\$46.33	\$8.60	\$17.32	\$0.00	\$72.25
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	06/01/2024	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 1</i>	12/01/2020	\$39.90	\$8.60	\$17.32	\$0.00	\$65.82
	06/01/2021	\$40.92	\$8.60	\$17.32	\$0.00	\$66.84
	12/01/2021	\$41.93	\$8.60	\$17.32	\$0.00	\$67.85
	06/01/2022	\$42.93	\$8.60	\$17.32	\$0.00	\$68.85
	12/01/2022	\$43.93	\$8.60	\$17.32	\$0.00	\$69.85
	06/01/2023	\$44.93	\$8.60	\$17.32	\$0.00	\$70.85
	12/01/2023	\$46.18	\$8.60	\$17.32	\$0.00	\$72.10
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: TREE REMOVER <i>LABORERS - ZONE 1</i>	12/01/2020	\$39.90	\$8.60	\$17.32	\$0.00	\$65.82
	06/01/2021	\$40.92	\$8.60	\$17.32	\$0.00	\$66.84
	12/01/2021	\$41.93	\$8.60	\$17.32	\$0.00	\$67.85
	06/01/2022	\$42.93	\$8.60	\$17.32	\$0.00	\$68.85
	12/01/2022	\$43.93	\$8.60	\$17.32	\$0.00	\$69.85
	06/01/2023	\$44.93	\$8.60	\$17.32	\$0.00	\$70.85
	12/01/2023	\$46.18	\$8.60	\$17.32	\$0.00	\$72.10
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2021	\$42.57	\$11.39	\$20.14	\$0.00	\$74.10
	08/01/2021	\$43.69	\$11.39	\$20.30	\$0.00	\$75.38
	02/01/2022	\$44.16	\$11.39	\$20.30	\$0.00	\$75.85

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

**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.29	\$11.39	\$20.14	\$0.00	\$52.82
2	60	\$25.54	\$11.39	\$20.14	\$0.00	\$57.07
3	70	\$29.80	\$11.39	\$20.14	\$0.00	\$61.33
4	80	\$34.06	\$11.39	\$20.14	\$0.00	\$65.59
5	90	\$38.31	\$11.39	\$20.14	\$0.00	\$69.84

**Effective Date - 08/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.85	\$11.39	\$20.30	\$0.00	\$53.54
2	60	\$26.21	\$11.39	\$20.30	\$0.00	\$57.90
3	70	\$30.58	\$11.39	\$20.30	\$0.00	\$62.27
4	80	\$34.95	\$11.39	\$20.30	\$0.00	\$66.64
5	90	\$39.32	\$11.39	\$20.30	\$0.00	\$71.01

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
MARBLE MASONS, TILELAYERS & TERRAZZO MECH <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2021	\$55.77	\$11.39	\$22.08	\$0.00	\$89.24
	08/01/2021	\$57.17	\$11.39	\$22.24	\$0.00	\$90.80
	02/01/2022	\$57.74	\$11.39	\$22.24	\$0.00	\$91.37

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

**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.89	\$11.39	\$22.08	\$0.00	\$61.36
2	60	\$33.46	\$11.39	\$22.08	\$0.00	\$66.93
3	70	\$39.04	\$11.39	\$22.08	\$0.00	\$72.51
4	80	\$44.62	\$11.39	\$22.08	\$0.00	\$78.09
5	90	\$50.19	\$11.39	\$22.08	\$0.00	\$83.66

**Effective Date - 08/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.59	\$11.39	\$22.24	\$0.00	\$62.22
2	60	\$34.30	\$11.39	\$22.24	\$0.00	\$67.93
3	70	\$40.02	\$11.39	\$22.24	\$0.00	\$73.65
4	80	\$45.74	\$11.39	\$22.24	\$0.00	\$79.37
5	90	\$51.45	\$11.39	\$22.24	\$0.00	\$85.08

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

MECH. SWEEPER OPERATOR (ON CONST. SITES) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 1) <i>MILLWRIGHTS LOCAL 1121 - Zone 1</i>	01/04/2021	\$44.07	\$9.40	\$20.45	\$0.00	\$73.92
	01/03/2022	\$45.82	\$9.40	\$20.45	\$0.00	\$75.67
	01/02/2023	\$47.57	\$9.40	\$20.45	\$0.00	\$77.42

**Apprentice - MILLWRIGHT - Local 1121 Zone 1**

**Effective Date - 01/04/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$24.24	\$9.40	\$5.58	\$0.00	\$39.22
2	65	\$28.65	\$9.40	\$16.90	\$0.00	\$54.95
3	75	\$33.05	\$9.40	\$17.92	\$0.00	\$60.37
4	85	\$37.46	\$9.40	\$18.93	\$0.00	\$65.79

**Notes:** Step 1&2 Appr. indentured after 1/1/2020 receive no pension, but do receive annuity. (Step 1 \$5.58, Step 2 \$6.50)  
Steps are 2,000 hours

**Apprentice to Journeyworker Ratio:1:5**

<b>MORTAR MIXER</b> <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35

For apprentice rates see "Apprentice- LABORER"

<b>OILER (OTHER THAN TRUCK CRANES,GRADALLS)</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$23.20	\$13.50	\$15.70	\$0.00	\$52.40
	06/01/2021	\$23.75	\$13.50	\$15.70	\$0.00	\$52.95
	12/01/2021	\$24.33	\$13.50	\$15.70	\$0.00	\$53.53

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OILER (TRUCK CRANES, GRADALLS)</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$27.97	\$13.50	\$15.70	\$0.00	\$57.17
	06/01/2021	\$28.61	\$13.50	\$15.70	\$0.00	\$57.81
	12/01/2021	\$29.29	\$13.50	\$15.70	\$0.00	\$58.49

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OTHER POWER DRIVEN EQUIPMENT - CLASS II</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>PAINTER (BRIDGES/TANKS)</b> <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2021	\$52.06	\$8.25	\$22.75	\$0.00	\$83.06
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**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.03	\$8.25	\$0.00	\$0.00	\$34.28
2	55	\$28.63	\$8.25	\$6.16	\$0.00	\$43.04
3	60	\$31.24	\$8.25	\$6.72	\$0.00	\$46.21
4	65	\$33.84	\$8.25	\$7.28	\$0.00	\$49.37
5	70	\$36.44	\$8.25	\$19.39	\$0.00	\$64.08
6	75	\$39.05	\$8.25	\$19.95	\$0.00	\$67.25
7	80	\$41.65	\$8.25	\$20.51	\$0.00	\$70.41
8	90	\$46.85	\$8.25	\$21.63	\$0.00	\$76.73

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2021	\$42.96	\$8.25	\$22.75	\$0.00	\$73.96
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\* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.48	\$8.25	\$0.00	\$0.00	\$29.73
2	55	\$23.63	\$8.25	\$6.16	\$0.00	\$38.04
3	60	\$25.78	\$8.25	\$6.72	\$0.00	\$40.75
4	65	\$27.92	\$8.25	\$7.28	\$0.00	\$43.45
5	70	\$30.07	\$8.25	\$19.39	\$0.00	\$57.71
6	75	\$32.22	\$8.25	\$19.95	\$0.00	\$60.42
7	80	\$34.37	\$8.25	\$20.51	\$0.00	\$63.13
8	90	\$38.66	\$8.25	\$21.63	\$0.00	\$68.54

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2021	\$41.02	\$8.25	\$22.75	\$0.00	\$72.02
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PAINTERS LOCAL 35 - ZONE 2

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.51	\$8.25	\$0.00	\$0.00	\$28.76
2	55	\$22.56	\$8.25	\$6.16	\$0.00	\$36.97
3	60	\$24.61	\$8.25	\$6.72	\$0.00	\$39.58
4	65	\$26.66	\$8.25	\$7.28	\$0.00	\$42.19
5	70	\$28.71	\$8.25	\$19.39	\$0.00	\$56.35
6	75	\$30.77	\$8.25	\$19.95	\$0.00	\$58.97
7	80	\$32.82	\$8.25	\$20.51	\$0.00	\$61.58
8	90	\$36.92	\$8.25	\$21.63	\$0.00	\$66.80

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

Painter / Taper (BRUSH, NEW) *	01/01/2021	\$41.56	\$8.25	\$22.75	\$0.00	\$72.56
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\* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2

**Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.78	\$8.25	\$0.00	\$0.00	\$29.03
2	55	\$22.86	\$8.25	\$6.16	\$0.00	\$37.27
3	60	\$24.94	\$8.25	\$6.72	\$0.00	\$39.91
4	65	\$27.01	\$8.25	\$7.28	\$0.00	\$42.54
5	70	\$29.09	\$8.25	\$19.39	\$0.00	\$56.73
6	75	\$31.17	\$8.25	\$19.95	\$0.00	\$59.37
7	80	\$33.25	\$8.25	\$20.51	\$0.00	\$62.01
8	90	\$37.40	\$8.25	\$21.63	\$0.00	\$67.28

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

Painter / Taper (BRUSH, REPAINT)	01/01/2021	\$39.62	\$8.25	\$22.75	\$0.00	\$70.62
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PAINTERS LOCAL 35 - ZONE 2

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT**

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.81	\$8.25	\$0.00	\$0.00	\$28.06
2	55	\$21.79	\$8.25	\$6.16	\$0.00	\$36.20
3	60	\$23.77	\$8.25	\$6.72	\$0.00	\$38.74
4	65	\$25.75	\$8.25	\$7.28	\$0.00	\$41.28
5	70	\$27.73	\$8.25	\$19.39	\$0.00	\$55.37
6	75	\$29.72	\$8.25	\$19.95	\$0.00	\$57.92
7	80	\$31.70	\$8.25	\$20.51	\$0.00	\$60.46
8	90	\$35.66	\$8.25	\$21.63	\$0.00	\$65.54

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

Painter Traffic Markings (Heavy/Highway)	12/01/2020	\$39.90	\$8.60	\$17.32	\$0.00	\$65.82
LABORERS - ZONE 1 (HEAVY & HIGHWAY)	06/01/2021	\$40.92	\$8.60	\$17.32	\$0.00	\$66.84
	12/01/2021	\$41.93	\$8.60	\$17.32	\$0.00	\$67.85
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER	12/01/2020	\$36.08	\$12.91	\$14.82	\$0.00	\$63.81
TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	06/01/2021	\$36.88	\$12.91	\$14.82	\$0.00	\$64.61
	08/01/2021	\$36.88	\$13.41	\$14.82	\$0.00	\$65.11
	12/01/2021	\$36.88	\$13.41	\$16.01	\$0.00	\$66.30
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
PILE DRIVER LOCAL 56 (ZONE 1)						
For apprentice rates see "Apprentice- PILE DRIVER"						
PILE DRIVER	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
PILE DRIVER LOCAL 56 (ZONE 1)						

**Apprentice - PILE DRIVER - Local 56 Zone 1**

**Effective Date - 08/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.54	\$9.40	\$23.12	\$0.00	\$57.06
2	60	\$29.44	\$9.40	\$23.12	\$0.00	\$61.96
3	70	\$34.35	\$9.40	\$23.12	\$0.00	\$66.87
4	75	\$36.80	\$9.40	\$23.12	\$0.00	\$69.32
5	80	\$39.26	\$9.40	\$23.12	\$0.00	\$71.78
6	80	\$39.26	\$9.40	\$23.12	\$0.00	\$71.78
7	90	\$44.16	\$9.40	\$23.12	\$0.00	\$76.68
8	90	\$44.16	\$9.40	\$23.12	\$0.00	\$76.68

**Notes:**

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
 Step 1&2 \$34.01/ 3&4 \$41.46/ 5&6 \$62.80/ 7&8 \$69.25

**Apprentice to Journeyworker Ratio:1:5**

PIPEFITTER & STEAMFITTER	09/01/2020	\$56.44	\$11.70	\$20.24	\$0.00	\$88.38
PIPEFITTERS LOCAL 537	03/01/2021	\$57.94	\$11.70	\$20.24	\$0.00	\$89.88

**Apprentice - PIPEFITTER - Local 537**

**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$22.58	\$11.70	\$8.25	\$0.00	\$42.53
2	45	\$25.40	\$11.70	\$20.24	\$0.00	\$57.34
3	60	\$33.86	\$11.70	\$20.24	\$0.00	\$65.80
4	70	\$39.51	\$11.70	\$20.24	\$0.00	\$71.45
5	80	\$45.15	\$11.70	\$20.24	\$0.00	\$77.09

**Effective Date - 03/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$23.18	\$11.70	\$8.25	\$0.00	\$43.13
2	45	\$26.07	\$11.70	\$20.24	\$0.00	\$58.01
3	60	\$34.76	\$11.70	\$20.24	\$0.00	\$66.70
4	70	\$40.56	\$11.70	\$20.24	\$0.00	\$72.50
5	80	\$46.35	\$11.70	\$20.24	\$0.00	\$78.29

**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:\*\***

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIPELAYER <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PLUMBERS & GASFITTERS <i>PLUMBERS &amp; GASFITTERS LOCAL 12</i>	09/01/2020	\$58.69	\$13.57	\$17.26	\$0.00	\$89.52
	03/01/2021	\$60.19	\$13.57	\$17.26	\$0.00	\$91.02

**Apprentice - PLUMBER/GASFITTER - Local 12**

**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$20.54	\$13.57	\$6.24	\$0.00	\$40.35
2	40	\$23.48	\$13.57	\$7.08	\$0.00	\$44.13
3	55	\$32.28	\$13.57	\$9.63	\$0.00	\$55.48
4	65	\$38.15	\$13.57	\$11.33	\$0.00	\$63.05
5	75	\$44.02	\$13.57	\$13.03	\$0.00	\$70.62

**Effective Date - 03/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$21.07	\$13.57	\$6.24	\$0.00	\$40.88
2	40	\$24.08	\$13.57	\$7.08	\$0.00	\$44.73
3	55	\$33.10	\$13.57	\$9.63	\$0.00	\$56.30
4	65	\$39.12	\$13.57	\$11.33	\$0.00	\$64.02
5	75	\$45.14	\$13.57	\$13.03	\$0.00	\$71.74

**Notes:**

\*\* 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr  
Step4 with lic\$66.82, Step5 with lic\$74.39

**Apprentice to Journeyworker Ratio:\*\***

PNEUMATIC CONTROLS (TEMP.) <i>PIPEFITTERS LOCAL 537</i>	09/01/2020	\$56.44	\$11.70	\$20.24	\$0.00	\$88.38
	03/01/2021	\$57.94	\$11.70	\$20.24	\$0.00	\$89.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY)	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
<i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER	12/01/2020	\$40.90	\$8.60	\$17.32	\$0.00	\$66.82
<i>LABORERS - ZONE 1</i>	06/01/2021	\$41.92	\$8.60	\$17.32	\$0.00	\$67.84
	12/01/2021	\$42.93	\$8.60	\$17.32	\$0.00	\$68.85
	06/01/2022	\$43.93	\$8.60	\$17.32	\$0.00	\$69.85
	12/01/2022	\$44.93	\$8.60	\$17.32	\$0.00	\$70.85
	06/01/2023	\$45.93	\$8.60	\$17.32	\$0.00	\$71.85
	12/01/2023	\$47.18	\$8.60	\$17.32	\$0.00	\$73.10
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY)	12/01/2020	\$40.90	\$8.60	\$17.32	\$0.00	\$66.82
<i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	06/01/2021	\$41.92	\$8.60	\$17.32	\$0.00	\$67.84
	12/01/2021	\$42.93	\$8.60	\$17.32	\$0.00	\$68.85
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE	12/01/2020	\$49.98	\$13.50	\$15.70	\$0.00	\$79.18
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2021	\$51.08	\$13.50	\$15.70	\$0.00	\$80.28
	12/01/2021	\$52.23	\$13.50	\$15.70	\$0.00	\$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE)	12/01/2020	\$49.98	\$13.50	\$15.70	\$0.00	\$79.18
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2021	\$51.08	\$13.50	\$15.70	\$0.00	\$80.28
	12/01/2021	\$52.23	\$13.50	\$15.70	\$0.00	\$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER)	12/01/2020	\$33.00	\$13.50	\$15.70	\$0.00	\$62.20
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2021	\$33.75	\$13.50	\$15.70	\$0.00	\$62.95
	12/01/2021	\$34.54	\$13.50	\$15.70	\$0.00	\$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/12	08/01/2020	\$27.90	\$10.91	\$14.12	\$0.00	\$52.93
(Drivers Hired After 4/30/2012) <i>TEAMSTERS 25 (Metro) - Aggregate</i>	05/01/2021	\$29.15	\$10.91	\$15.25	\$0.00	\$55.31
	08/01/2021	\$29.15	\$11.41	\$15.25	\$0.00	\$55.81
	05/01/2022	\$30.40	\$11.41	\$15.25	\$0.00	\$57.06
	08/01/2022	\$30.40	\$11.91	\$15.25	\$0.00	\$57.56
READY-MIX CONCRETE DRIVER	08/01/2020	\$32.91	\$10.91	\$14.12	\$0.00	\$57.94
<i>TEAMSTERS 25 (Metro) - Aggregate</i>	05/01/2021	\$33.66	\$10.91	\$15.25	\$0.00	\$59.82
	08/01/2021	\$33.66	\$11.41	\$15.25	\$0.00	\$60.32
	05/01/2022	\$34.41	\$11.41	\$15.25	\$0.00	\$61.07
	08/01/2022	\$34.41	\$11.91	\$15.25	\$0.00	\$61.57
RECLAIMERS	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofing &Roofer Damproofg) <i>ROOFERS LOCAL 33</i>	02/01/2021	\$46.60	\$12.28	\$17.15	\$0.00	\$76.03
	08/01/2021	\$48.03	\$12.28	\$17.15	\$0.00	\$77.46
	02/01/2022	\$49.46	\$12.28	\$17.15	\$0.00	\$78.89

**Apprentice - ROOFER - Local 33**

**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.30	\$12.28	\$4.31	\$0.00	\$39.89
2	60	\$27.96	\$12.28	\$17.15	\$0.00	\$57.39
3	65	\$30.29	\$12.28	\$17.15	\$0.00	\$59.72
4	75	\$34.95	\$12.28	\$17.15	\$0.00	\$64.38
5	85	\$39.61	\$12.28	\$17.15	\$0.00	\$69.04

**Effective Date - 08/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.02	\$12.28	\$4.31	\$0.00	\$40.61
2	60	\$28.82	\$12.28	\$17.15	\$0.00	\$58.25
3	65	\$31.22	\$12.28	\$17.15	\$0.00	\$60.65
4	75	\$36.02	\$12.28	\$17.15	\$0.00	\$65.45
5	85	\$40.83	\$12.28	\$17.15	\$0.00	\$70.26

**Notes:** \*\* 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1  
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.  
(Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

**Apprentice to Journeyworker Ratio:\*\***

ROOFER SLATE / TILE / PRECAST CONCRETE <i>ROOFERS LOCAL 33</i>	02/01/2021	\$46.85	\$12.28	\$17.15	\$0.00	\$76.28
	08/01/2021	\$48.28	\$12.28	\$17.15	\$0.00	\$77.71
	02/01/2022	\$49.71	\$12.28	\$17.15	\$0.00	\$79.14
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	02/01/2021	\$51.67	\$13.65	\$24.57	\$2.70	\$92.59
	08/01/2021	\$53.42	\$13.65	\$24.57	\$2.75	\$94.39
	02/01/2022	\$55.17	\$13.65	\$24.57	\$2.80	\$96.19

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

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

**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$21.70	\$13.65	\$5.89	\$0.00	\$41.24
2	42	\$21.70	\$13.65	\$5.89	\$0.00	\$41.24
3	47	\$24.28	\$13.65	\$11.13	\$1.48	\$50.54
4	47	\$24.28	\$13.65	\$11.13	\$1.48	\$50.54
5	52	\$26.87	\$13.65	\$12.08	\$1.58	\$54.18
6	52	\$26.87	\$13.65	\$12.33	\$1.59	\$54.44
7	60	\$31.00	\$13.65	\$13.70	\$1.76	\$60.11
8	65	\$33.59	\$13.65	\$14.65	\$1.88	\$63.77
9	75	\$38.75	\$13.65	\$16.56	\$2.08	\$71.04
10	85	\$43.92	\$13.65	\$17.96	\$2.28	\$77.81

**Effective Date - 08/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$22.44	\$13.65	\$5.89	\$0.00	\$41.98
2	42	\$22.44	\$13.65	\$5.89	\$0.00	\$41.98
3	47	\$25.11	\$13.65	\$11.13	\$1.48	\$51.37
4	47	\$25.11	\$13.65	\$11.13	\$1.48	\$51.37
5	52	\$27.78	\$13.65	\$12.08	\$1.58	\$55.09
6	52	\$27.78	\$13.65	\$12.33	\$1.59	\$55.35
7	60	\$32.05	\$13.65	\$13.70	\$1.76	\$61.16
8	65	\$34.72	\$13.65	\$14.65	\$1.88	\$64.90
9	75	\$40.07	\$13.65	\$16.56	\$2.08	\$72.36
10	85	\$45.41	\$13.65	\$17.96	\$2.28	\$79.30

**Notes:**

Steps are 6 mos.

**Apprentice to Journeyworker Ratio:1:4**

SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2020	\$36.54	\$12.91	\$14.82	\$0.00	\$64.27
	06/01/2021	\$37.34	\$12.91	\$14.82	\$0.00	\$65.07
	08/01/2021	\$37.34	\$13.41	\$14.82	\$0.00	\$65.57
	12/01/2021	\$37.34	\$13.41	\$16.01	\$0.00	\$66.76
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2020	\$36.83	\$12.91	\$14.82	\$0.00	\$64.56
	06/01/2021	\$37.63	\$12.91	\$14.82	\$0.00	\$65.36
	08/01/2021	\$37.63	\$13.41	\$14.82	\$0.00	\$65.86
	12/01/2021	\$37.63	\$13.41	\$16.01	\$0.00	\$67.05
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1</i>	01/01/2021	\$61.45	\$10.00	\$20.75	\$0.00	\$92.20
	03/01/2021	\$62.45	\$10.00	\$21.25	\$0.00	\$93.70

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

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

**Effective Date - 01/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$21.51	\$10.00	\$11.81	\$0.00	\$43.32
2	40	\$24.58	\$10.00	\$12.50	\$0.00	\$47.08
3	45	\$27.65	\$10.00	\$13.19	\$0.00	\$50.84
4	50	\$30.73	\$10.00	\$13.93	\$0.00	\$54.66
5	55	\$33.80	\$10.00	\$14.56	\$0.00	\$58.36
6	60	\$36.87	\$10.00	\$15.25	\$0.00	\$62.12
7	65	\$39.94	\$10.00	\$15.94	\$0.00	\$65.88
8	70	\$43.02	\$10.00	\$16.63	\$0.00	\$69.65
9	75	\$46.09	\$10.00	\$17.31	\$0.00	\$73.40
10	80	\$49.16	\$10.00	\$18.00	\$0.00	\$77.16

**Effective Date - 03/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$21.86	\$10.00	\$11.99	\$0.00	\$43.85
2	40	\$24.98	\$10.00	\$12.70	\$0.00	\$47.68
3	45	\$28.10	\$10.00	\$13.41	\$0.00	\$51.51
4	50	\$31.23	\$10.00	\$14.13	\$0.00	\$55.36
5	55	\$34.35	\$10.00	\$14.84	\$0.00	\$59.19
6	60	\$37.47	\$10.00	\$15.55	\$0.00	\$63.02
7	65	\$40.59	\$10.00	\$16.26	\$0.00	\$66.85
8	70	\$43.72	\$10.00	\$16.98	\$0.00	\$70.70
9	75	\$46.84	\$10.00	\$17.69	\$0.00	\$74.53
10	80	\$49.96	\$10.00	\$18.40	\$0.00	\$78.36

**Notes:** Apprentice entered prior 9/30/10:  
40/45/50/55/60/65/70/75/80/85  
Steps are 850 hours

**Apprentice to Journeyworker Ratio:1:3**

STEAM BOILER OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 103</i>	09/01/2020	\$40.84	\$13.00	\$17.53	\$0.00	\$71.37
	03/01/2021	\$42.11	\$13.00	\$17.88	\$0.00	\$72.99
	09/01/2021	\$43.77	\$13.00	\$18.00	\$0.00	\$74.77
	03/01/2022	\$45.27	\$13.00	\$18.12	\$0.00	\$76.39
	09/01/2022	\$46.99	\$13.00	\$18.24	\$0.00	\$78.23
	03/01/2023	\$48.54	\$13.00	\$18.37	\$0.00	\$79.91

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - TELECOMMUNICATION TECHNICIAN - Local 103**

**Effective Date - 09/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$18.38	\$13.00	\$0.55	\$0.00	\$31.93
2	45	\$18.38	\$13.00	\$0.55	\$0.00	\$31.93
3	50	\$20.42	\$13.00	\$14.20	\$0.00	\$47.62
4	50	\$20.42	\$13.00	\$14.20	\$0.00	\$47.62
5	55	\$22.46	\$13.00	\$14.53	\$0.00	\$49.99
6	60	\$24.50	\$13.00	\$14.87	\$0.00	\$52.37
7	65	\$26.55	\$13.00	\$15.20	\$0.00	\$54.75
8	70	\$28.59	\$13.00	\$15.53	\$0.00	\$57.12
9	75	\$30.63	\$13.00	\$15.87	\$0.00	\$59.50
10	80	\$32.67	\$13.00	\$16.20	\$0.00	\$61.87

**Effective Date - 03/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$18.95	\$13.00	\$0.57	\$0.00	\$32.52
2	45	\$18.95	\$13.00	\$0.57	\$0.00	\$32.52
3	50	\$21.06	\$13.00	\$14.47	\$0.00	\$48.53
4	50	\$21.06	\$13.00	\$14.47	\$0.00	\$48.53
5	55	\$23.16	\$13.00	\$14.80	\$0.00	\$50.96
6	60	\$25.27	\$13.00	\$15.14	\$0.00	\$53.41
7	65	\$27.37	\$13.00	\$15.47	\$0.00	\$55.84
8	70	\$29.48	\$13.00	\$15.80	\$0.00	\$58.28
9	75	\$31.58	\$13.00	\$16.15	\$0.00	\$60.73
10	80	\$33.69	\$13.00	\$16.48	\$0.00	\$63.17

**Notes:**

**Apprentice to Journeyworker Ratio:1:1**

TERRAZZO FINISHERS	02/01/2021	\$54.69	\$11.39	\$22.09	\$0.00	\$88.17
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2021	\$56.09	\$11.39	\$22.25	\$0.00	\$89.73
	02/01/2022	\$56.68	\$11.39	\$22.25	\$0.00	\$90.32

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

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

**Effective Date - 02/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.35	\$11.39	\$22.09	\$0.00	\$60.83
2	60	\$32.81	\$11.39	\$22.09	\$0.00	\$66.29
3	70	\$38.28	\$11.39	\$22.09	\$0.00	\$71.76
4	80	\$43.75	\$11.39	\$22.09	\$0.00	\$77.23
5	90	\$49.22	\$11.39	\$22.09	\$0.00	\$82.70

**Effective Date - 08/01/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.05	\$11.39	\$22.25	\$0.00	\$61.69
2	60	\$33.65	\$11.39	\$22.25	\$0.00	\$67.29
3	70	\$39.26	\$11.39	\$22.25	\$0.00	\$72.90
4	80	\$44.87	\$11.39	\$22.25	\$0.00	\$78.51
5	90	\$50.48	\$11.39	\$22.25	\$0.00	\$84.12

**Notes:**

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**Apprentice to Journeyworker Ratio:1:3**

<b>TEST BORING DRILLER</b> <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2020	\$41.30	\$8.60	\$17.47	\$0.00	\$67.37
	06/01/2021	\$42.32	\$8.60	\$17.47	\$0.00	\$68.39
	12/01/2021	\$43.33	\$8.60	\$17.47	\$0.00	\$69.40
For apprentice rates see "Apprentice- LABORER"						
<b>TEST BORING DRILLER HELPER</b> <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2020	\$40.02	\$8.60	\$17.47	\$0.00	\$66.09
	06/01/2021	\$41.04	\$8.60	\$17.47	\$0.00	\$67.11
	12/01/2021	\$42.05	\$8.60	\$17.47	\$0.00	\$68.12
For apprentice rates see "Apprentice- LABORER"						
<b>TEST BORING LABORER</b> <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2020	\$39.90	\$8.60	\$17.47	\$0.00	\$65.97
	06/01/2021	\$40.92	\$8.60	\$17.47	\$0.00	\$66.99
	12/01/2021	\$41.93	\$8.60	\$17.47	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
<b>TRACTORS/PORTABLE STEAM GENERATORS</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.45	\$13.50	\$15.70	\$0.00	\$78.65
	06/01/2021	\$50.54	\$13.50	\$15.70	\$0.00	\$79.74
	12/01/2021	\$51.68	\$13.50	\$15.70	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
<b>TRAILERS FOR EARTH MOVING EQUIPMENT</b> <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2020	\$37.12	\$12.91	\$14.82	\$0.00	\$64.85
	06/01/2021	\$37.92	\$12.91	\$14.82	\$0.00	\$65.65
	08/01/2021	\$37.92	\$13.41	\$14.82	\$0.00	\$66.15
	12/01/2021	\$37.92	\$13.41	\$16.01	\$0.00	\$67.34
<b>TUNNEL WORK - COMPRESSED AIR</b> <i>LABORERS (COMPRESSED AIR)</i>	12/01/2020	\$52.13	\$8.60	\$17.92	\$0.00	\$78.65
	06/01/2021	\$53.15	\$8.60	\$17.92	\$0.00	\$79.67
	12/01/2021	\$54.16	\$8.60	\$17.92	\$0.00	\$80.68
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2020	\$54.13	\$8.60	\$17.92	\$0.00	\$80.65
	06/01/2021	\$55.15	\$8.60	\$17.92	\$0.00	\$81.67
	12/01/2021	\$56.16	\$8.60	\$17.92	\$0.00	\$82.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2020	\$44.20	\$8.60	\$17.92	\$0.00	\$70.72
	06/01/2021	\$45.22	\$8.60	\$17.92	\$0.00	\$71.74
	12/01/2021	\$46.23	\$8.60	\$17.92	\$0.00	\$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2020	\$46.20	\$8.60	\$17.92	\$0.00	\$72.72
	06/01/2021	\$47.22	\$8.60	\$17.92	\$0.00	\$73.74
	12/01/2021	\$48.23	\$8.60	\$17.92	\$0.00	\$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2020	\$36.54	\$12.91	\$14.82	\$0.00	\$64.27
	06/01/2021	\$37.34	\$12.91	\$14.82	\$0.00	\$65.07
	08/01/2021	\$37.34	\$13.41	\$14.82	\$0.00	\$65.57
	12/01/2021	\$37.34	\$13.41	\$16.01	\$0.00	\$66.76
WAGON DRILL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
	06/01/2022	\$43.18	\$8.60	\$17.32	\$0.00	\$69.10
	12/01/2022	\$44.18	\$8.60	\$17.32	\$0.00	\$70.10
	06/01/2023	\$45.18	\$8.60	\$17.32	\$0.00	\$71.10
	12/01/2023	\$46.43	\$8.60	\$17.32	\$0.00	\$72.35
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 1 (HEAVY &amp; HIGHWAY)</i>	12/01/2020	\$40.15	\$8.60	\$17.32	\$0.00	\$66.07
	06/01/2021	\$41.17	\$8.60	\$17.32	\$0.00	\$67.09
	12/01/2021	\$42.18	\$8.60	\$17.32	\$0.00	\$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2020	\$49.98	\$13.50	\$15.70	\$0.00	\$79.18
	06/01/2021	\$51.08	\$13.50	\$15.70	\$0.00	\$80.28
	12/01/2021	\$52.23	\$13.50	\$15.70	\$0.00	\$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS &amp; GASFITTERS LOCAL 12</i>	09/01/2020	\$58.69	\$13.57	\$17.26	\$0.00	\$89.52
	03/01/2021	\$60.19	\$13.57	\$17.26	\$0.00	\$91.02
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
<b>Outside Electrical - East</b>						
CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$29.67	\$9.25	\$1.89	\$0.00	\$40.81
	For apprentice rates see "Apprentice- LINEMAN"					
CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$42.03	\$9.25	\$10.27	\$0.00	\$61.55
	For apprentice rates see "Apprentice- LINEMAN"					
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$34.62	\$9.25	\$10.07	\$0.00	\$53.94
	For apprentice rates see "Apprentice- LINEMAN"					
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$27.20	\$9.25	\$1.82	\$0.00	\$38.27
	For apprentice rates see "Apprentice- LINEMAN"					

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$42.03	\$9.25	\$14.35	\$0.00	\$65.63
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$37.09	\$9.25	\$10.87	\$0.00	\$57.21
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$27.20	\$9.25	\$1.82	\$0.00	\$38.27
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$22.25	\$9.25	\$1.82	\$0.00	\$33.32
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$49.45	\$9.25	\$17.48	\$0.00	\$76.18

**Apprentice - LINEMAN (Outside Electrical) - East Local 104**

**Effective Date - 08/30/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$29.67	\$9.25	\$3.39	\$0.00	\$42.31
2	65	\$32.14	\$9.25	\$3.46	\$0.00	\$44.85
3	70	\$34.62	\$9.25	\$3.54	\$0.00	\$47.41
4	75	\$37.09	\$9.25	\$5.11	\$0.00	\$51.45
5	80	\$39.56	\$9.25	\$5.19	\$0.00	\$54.00
6	85	\$42.03	\$9.25	\$5.26	\$0.00	\$56.54
7	90	\$44.51	\$9.25	\$7.34	\$0.00	\$61.10

**Notes:**

**Apprentice to Journeyworker Ratio:1:2**

TELEDATA CABLE SPLICER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$30.73	\$4.70	\$3.17	\$0.00	\$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77

**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.

BY-LAWS OF THE TOWN OF ARLINGTON  
TITLE I  
ARTICLE 16

CONSTRUCTION PROJECTS

**Section 1. Women Work Force Participation**

Any Town board or official in charge of a construction or reconstruction project is required to include in the contract documents the following:

- A. Contractor shall maintain as a goal on this project a not less than five percent ratio of women work force to total project hours in both the general contract and each individual filed sub-bid contract, if applicable. The preceding sentence shall be included in all construction contracts whether entered into by the Town pursuant to the provisions of M.G.L. c. 149 or M.G. L. c 30, §39M et. seq. provided however, that if entered into under Chapter 30 same shall not be deemed to apply where the projected bid price as determined by the Director of Public Works is not likely to exceed \$200,000.
- B. A Labor Scheduling Table which will be used as a tool for achieving a range of women work force participation for the entire project in both the general contract and each individual filed sub-bid contract.

**Section 2. Equal Opportunity Goal Compliance**

Any Town board or official in charge of a construction or reconstruction project is required to include in the contract documents the following:

- A. Before starting work, the contractors (includes the general contractor, for itself and its subcontractors, as well as all filed sub-bid contractors, if applicable) will submit plans for achievement of the equal opportunity goals of the contract. All contractors will be required to make a good faith effort to achieve these goals. The plan will indicate if the contractors expect to achieve the requirements during the first quarter. If there are reasons why the contractors do not expect to achieve the requirements during the first quarter year of the contract construction phase, then the contractors shall provide a plan calculated to address, to the extent reasonably possibly, these obstacles to a good faith effort to achieve such goals.
- B. Not more than ten days following the end of each work quarter, the contractors will report on the achievement of the goals, detailing the good faith efforts that have been made and will continue to be made and any other appropriate efforts not yet undertaken.
- C. All reports will be signed by an officer or principal of the company who has the authority to contractually obligate the company.

**Section 3. Recruitment and Training**

Any board, officer, committee, or other agency of the Town, which acts on behalf of the Town in making or supervising any contract, in an amount exceeding the sum of \$100,000 for the purchase of goods or services or for the construction, renovation, or repair of buildings or other improvement of real estate, may make arrangements with contractors and other interested agencies for special programs of recruitment and training in connection with the work to be performed on such contract, with the objective of promoting equal employment opportunity for members of minority groups protected by the fair employment laws of the Commonwealth and the United States. Any board, officer, committee or other Town agency may expend Town funds in carrying them out provided that appropriations specifically designed for such purposes have been voted by the Town Meeting.





## TOWN OF ARLINGTON EQUAL OPPORTUNITY ADVISORY COMMITTEE

730 MASSACHUSETTS AVENUE, ARLINGTON, MA 02476  
PHONE (781) 316-3120 FAX: (781) 316-3129

TRICIA O'DONOGHUE, CHAIR  
BARBARA BOLTZ  
AUGUSTA HAYDOCK  
JACK JONES

CARYN COVE MALLOY  
EQUAL OPPORTUNITY OFFICER

### CONTRACTOR CERTIFICATION

During the performance of the Contract, the Contractor and all subcontractors (hereafter collectively referred to as "the Contractor") for a town construction contract or town assisted construction contract, for him/herself, his/her assignees and successors in interest, agree to comply with all applicable equal employment opportunity, non-discrimination and affirmative action requirements, including but not limited to the following:

The Contractor shall comply with the provisions of Town of Arlington Bylaws, Anti-Discrimination policies and Chapter 151B of the Massachusetts General Laws, as amended, and all other applicable anti-discrimination and equal opportunity laws, all of which are herein incorporated by reference and made a part of this contract.

In connection with the performance of work under this contract, the Contractor shall undertake, in good faith, affirmative action measures to eliminate any discriminatory barrier in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, sex, gender identity, sexual orientation, age, genetic information, ancestry, children, marital status, veteran status or membership in the armed service, the receiving of public assistance, and handicap. Such affirmative action measures shall entail a list of positive and aggressive measures which shall include but not be limited to, advertising employment opportunities in minority and other community news media; notifying minority women and other community-based organizations of employment opportunities; maintaining a file of names and addresses of each worker referred to the Contractor and what action was taken concerning such worker; and notifying this Committee in writing when a union with whom the Contractor has a collective bargaining agreement has failed to refer a minority or woman worker.

The Contractor shall submit to the Equal Opportunity Advisory Committee, through the Purchasing Director Domenic Lanzillotti, the following Contractor's Certification with all attachments. The Contractor's Certification will be reviewed by the Committee and will inform the Contractor of any deficiencies to be corrected.

## CONTRACTOR CERTIFICATION

\_\_\_\_\_ certifies that they:

(Contractor Name)

1. Will not discriminate in their employment practices.
2. Intend to use, if General Contractor, the following listed construction trades in the work under the contract:

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3. If Trade Subcontractor, will provide the following work under the contract:

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4. Will make good faith efforts to comply with the minority employee and women employee workforce participation ratio goals of the Town of Arlington and the Commonwealth of Massachusetts and specific affirmative steps contained herein; and to provide evidence of its good faith efforts. Attached hereto, please find:

- A. Employment Opportunities advertised in:

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- B. Notification to Minority/Women/Community based Organizations such as:

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C. List of workers referred to Contractor and note on what action was taken:

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D. Written notification that Union/Local No. \_\_\_\_\_ failed to refer a Minority or  
Female worker during the week of: \_\_\_\_\_

---

Signature of Officer

Date

---

Printed Name of Officer and Title

STANDARD  
GENERAL CONDITIONS  
OF THE  
CONSTRUCTION CONTRACT

Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE  
*a practice division of the*  
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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AMERICAN CONSULTING ENGINEERS COUNCIL

-----  
AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General

Contractors of America

Construction Specifications Institute

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National Society of Professional Engineers  
1420 King Street, Alexandria, VA 22314

American Consulting Engineers Council  
1015 15th Street N.W., Washington, DC 20005

American Society of Civil Engineers  
345 East 47th Street, New York, NY 10017

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## GENERAL CONDITIONS

### ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

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#### 1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

3. *Application for Payment*--The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

9. *Change Order*--A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the

Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.

13. *Contract Price*--The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Substantial Completion; and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.

15. *CONTRACTOR*--The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*--See paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *ENGINEER*--The individual or entity named as such in the Agreement.

20. *ENGINEER's Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

21. *Field Order*--A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

24. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

25. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *Samples*--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.

39. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

40. *Site*--Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *Subcontractor*--An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.

43. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

46. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

49. *Work Change Directive*--A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 *Terminology*

A. *Intent of Certain Terms or Adjectives*

1. Whenever in the Contract Documents the terms “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 an action or determination of ENGINEER as to the Work, it is intended that such action or determination 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). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.10 or any other provision of the Contract Documents.

B. *Day*

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

C. *Defective*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.04 or 14.05).

D. *Furnish, Install, Perform, Provide*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other

specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, “provide” is implied.

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

ARTICLE 2 - PRELIMINARY MATTERS

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2.01 *Delivery of Bonds*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.02\* *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

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

mence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

#### 2.04 *Starting the Work*

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

\*See Supplementary Conditions

#### 2.05\* *Before Starting Construction*

A. *CONTRACTOR's Review of Contract Documents:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

1. a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
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
3. a preliminary schedule of values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into

component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

\* C. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with Article 5.

#### 2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

#### 2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.05.B. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

1. The progress schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within any specified Milestones and the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.

2. CONTRACTOR's schedule of Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

3. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

\*See Supplementary Conditions

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT,  
AMENDING, REUSE

3.01\* *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.04; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

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

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

### 3.04 *Amending and Supplementing Contract Documents*

A. 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

\*See Supplementary Conditions

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

### 3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

## ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

### 4.01 *Availability of Lands*

A. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or

restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

B. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

### 4.02\* *Subsurface and Physical Conditions*

A.\* *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, includ-

ing, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

\*See Supplementary Conditions

#### 4.03 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *ENGINEER's Review:* After receipt of written notice as required by paragraph 4.03.A, ENGINEER will promptly review the pertinent condition, determine the

necessity of OWNER's obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

#### C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.08 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment; or

c. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be



made therefor as provided in paragraph 10.05. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

#### 4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, including OWNER, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

#### B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or

performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

2. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price of Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

#### 4.05\* *Reference Points*

A. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of OWNER.

CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

#### 4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings*: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized*: CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or

\*See Supplementary Conditions

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition;

(ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefor as provided in paragraph 10.05.

F. If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 10.05.

OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or

Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.E shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.F shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

\*See Supplementary Conditions

## ARTICLE 5 - BONDS AND INSURANCE

### 5.01\* *Performance, Payment, and Other Bonds*

A. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B.\* All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Compa-

nies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.01.B, CONTRACTOR shall within 20 days thereafter substitute another Bond and surety, both of which shall comply with the requirements of paragraphs 5.01.B and 5.02.

### 5.02 *Licensed Sureties and Insurers*

A. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

### 5.03 *Certificates of Insurance*

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.

### 5.04\* *CONTRACTOR's Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to

perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;
3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;
4. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;
5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

\*See Supplementary Conditions

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

#### 5.05 *OWNER's Liability Insurance*

A.\* In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.04, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

#### 5.06\* *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property

insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

\*See Supplementary Conditions

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER;

5. allow for partial utilization of the Work by OWNER;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR, and ENGINEER with

30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B.\* OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C.\* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D.\* OWNER shall not be responsible for purchasing and maintaining any property insurance specified in this paragraph 5.06 to protect the interests of CONTRACTOR, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by CONTRACTOR, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E.\* If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the Site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

#### 5.07 *Waiver of Rights*

A.\* OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraph 5.06 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and all other

individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) under such policies for losses and damages so caused.

None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

B. OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for:

\*See Supplementary Conditions

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to OWNER's property or the Work caused by, arising out of, or resulting from fire or other peril whether or not insured by OWNER; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to

paragraph 14.05, after Substantial Completion pursuant to paragraph 14.04, or after final payment pursuant to paragraph 14.07.

C. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against CONTRACTOR, Subcontractors, ENGINEER, or ENGINEER's Consultants and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

#### 5.08\* *Receipt and Application of Insurance Proceeds*

A.\* Any insured loss under the policies of insurance required by paragraph 5.06 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.08.B. OWNER shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

B.\* OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

#### 5.09\* *Acceptance of Bonds and Insurance; Option to Replace*

A.\* If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the

certificates (or other evidence requested) required by paragraph 2.05.C. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

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6.01 *Supervision and Superintendence*

A. CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with

\*See Supplementary Conditions

the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of

construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the

Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly

run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

#### 6.04 *Progress Schedule*

A. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.07 as it may be adjusted from time to time as provided below.

1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.07) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

#### 6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. *"Or-Equal" Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be

considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment ENGINEER determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

#### 2. *Substitute Items*

a. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify



that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

*B. Substitute Construction Methods or Procedures:*

If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.05.A.2.

*C. Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.05.A and 6.05.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a

substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

*D. Special Guarantee:* OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

*E. ENGINEER's Cost Reimbursement:* ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute.

*F. CONTRACTOR's Expense:* CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to OWNER in advance for acceptance by OWNER by a specified date prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement

for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

C. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRAC-

TOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

#### 6.07 *Patent Fees and Royalties*

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

#### 6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for

the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

#### 6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

B. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in paragraph 10.05.

#### 6.10\* *Taxes*

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

#### 6.11\* *Use of Site and Other Areas*

##### A.\* *Limitation on Use of Site and Other Areas*

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations,

\*See Supplementary Conditions

and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures*: CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

#### 6.12 *Record Documents*

A. CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER.

#### 6.13 *Safety and Protection*

A. CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and other 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. All damage, injury, or loss to any property referred to in paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

#### 6.14 *Safety Representative*

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

#### 6.15 *Hazard Communication Programs*

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

#### 6.16 *Emergencies*

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

6.17\* *Shop Drawings and Samples*

A.\* CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies 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 ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.E.

B.\* CONTRACTOR shall also submit six (6) Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

D. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

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

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

c. all information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or

\*See Supplementary Conditions

Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

E. *ENGINEER's Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER. ENGINEER's review and approval will be only to determine if the items covered by the submittals

will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure 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.

3. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.D.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

#### F. *Resubmittal Procedures*

1. CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

#### 6.18 *Continuing the Work*

A. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

#### 6.19 *CONTRACTOR's General Warranty and Guarantee*

A. CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or
2. normal wear and tear under normal usage.

B. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:

1. observations by ENGINEER;
2. recommendation by ENGINEER or payment by OWNER of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;
4. use or occupancy of the Work or any part thereof by OWNER;
5. any acceptance by OWNER or any failure to do so;
6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by OWNER.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and

2. is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not extend to the liability of ENGINEER and ENGINEER's Consultants or to the officers, directors, partners, employees, agents, and

other consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

ARTICLE 7 - OTHER WORK

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7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or let other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of

such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to so report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent defects and deficiencies in such other work.

#### 7.02 *Coordination*

A. If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
2. the specific matters to be covered by such authority and responsibility will be itemized; and
3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility for such coordination.

### ARTICLE 8 - OWNER'S RESPONSIBILITIES

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#### 8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

#### 8.02 *Replacement of ENGINEER*

A. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

#### 8.03 *Furnish Data*

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

#### 8.04 *Pay Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.02.C and 14.07.C.

#### 8.05 *Lands and Easements; Reports and Tests*

A. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

\*See Supplementary Conditions

#### 8.06\* *Insurance*

A.\* OWNER's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

#### 8.07 *Change Orders*

A. OWNER is obligated to execute Change Orders as indicated in paragraph 10.03.

#### 8.08 *Inspections, Tests, and Approvals*

A. OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.03.B.



8.09 *Limitations on OWNER's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

A. OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

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9.01 *OWNER'S Representative*

A. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and will not be changed without written consent of OWNER and ENGINEER.

9.02 *Visits to Site*

A. ENGINEER will make visits to the Site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and

observations, ENGINEER, for the benefit of OWNER, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work.

B. ENGINEER's visits and observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.10, and particularly, but without limitation, during or as a result of ENGINEER's visits or observations of CONTRACTOR's Work ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work.

9.03\* *Project Representative*

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the Site who is not ENGINEER's Consultant, agent or employee,

\*See Supplementary Conditions

the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Docu-

ments. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.05 *Authorized Variations in Work*

A. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms 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. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

#### 9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

#### 9.08 *Determinations for Unit Price Work*

A. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of paragraph 10.05.

#### 9.09 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

\*See Supplementary Conditions

#### 9.10 *Limitations on ENGINEER's Authority and Responsibilities*

A. Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such

authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

C. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this paragraph 9.10 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants. See Article 18.

## ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

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### 10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the

applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in paragraph 10.05.

### 10.02 *Unauthorized Changes in the Work*

A. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in paragraph 3.04, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.04.B.

### 10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

1. changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.01.A, (ii) required because of acceptance of defective Work under paragraph 13.08.A or OWNER's correction of defective Work under paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days

after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

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11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work

shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

3. Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER, who will then determine, with the advice of ENGINEER, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in this paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of

CONTRACTOR's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of CONTRACTOR.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.01.A.1 or specifically covered by paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site.

3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

4. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR's Fee:* When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.01.A and 11.01.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

#### 11.02 *Cash Allowances*

A. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. CONTRACTOR's costs for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

B. Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of

Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.08.

B. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

C. OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
2. there is no corresponding adjustment with respect any other item of Work; and
3. if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE;  
CHANGE OF CONTRACT TIMES

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12.01\* *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B.\* The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraph 11.03 ); or
2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.01.C.2); or
3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.01) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 12.01.C).

C. *CONTRACTOR's Fee*: The CONTRACTOR's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
  - a. for costs incurred under paragraphs 11.01.A.1 and 11.01.A.2, the CONTRACTOR's fee shall be 15 percent;

b. for costs incurred under paragraph 11.01.A.3, the CONTRACTOR's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

\*See Supplementary Conditions

d. no fee shall be payable on the basis of costs itemized under paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

#### 12.02 *Change of Contract Times*

A. The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones)

will be determined in accordance with the provisions of this Article 12.

#### 12.03 *Delays Beyond CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

#### 12.04 *Delays Within CONTRACTOR's Control*

A. The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

#### 12.05 *Delays Beyond OWNER's and CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

#### 12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility



owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

ARTICLE 13 - TESTS AND INSPECTIONS;  
CORRECTION, REMOVAL OR ACCEPTANCE OF  
DEFECTIVE WORK

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13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02\* *Access to Work*

A. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

13.03\* *Tests and Inspections*

A. CONTRACTOR shall give ENGINEER 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.

B.\* OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection or approval.

D. CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in paragraph 13.03.E shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in

question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

\*See Supplementary Conditions

#### 13.05 *OWNER May Stop the Work*

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

#### 13.06 *Correction or Removal of Defective Work*

A. CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

#### 13.07 *Correction Period*

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

B. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

D. CONTRACTOR's obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

#### 13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

#### 13.09 *OWNER May Correct Defective Work*

A. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.06.A, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice

to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors, and ENGINEER and ENGINEER's Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.

C. All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefor as provided in paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR's defective Work.

D. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

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14.01 *Schedule of Values*

A. The schedule of values established as provided in paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A.\* *Applications for Payments*

1. At least 20 days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect OWNER's interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to pro-gress payments will be as stipulated in the Agreement.

\*See Supplementary Conditions

B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

2. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's observations on the Site of the executed Work as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work.

3. By recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties

that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

4. Neither ENGINEER's review of CONTRACTOR's Work for the purposes of recommending payments nor ENGINEER's recommendation of any payment, including final payment, will impose responsibility on ENGINEER to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or to determine that title to any of the Work, materials, or equipment has passed to OWNER free and clear of any Liens.

5. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Written Amendment or Change Orders;
- c. OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or
- d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.

#### C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of paragraph 14.02.D) become due, and when due will be paid by OWNER to CONTRACTOR.

#### D. *Reduction in Payment*

1. OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

a. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.02.C.1.

#### 14.03 *CONTRACTOR's Warranty of Title*

A. 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 OWNER no later than the time of payment free and clear of all Liens.

#### 14.04 *Substantial Completion*

A. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Promptly thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion,

ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

A. Use by OWNER at OWNER's option of any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER, and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

2. No occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of paragraph 5.10 regarding property insurance.

#### 14.06 *Final Inspection*

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

#### 14.07 *Final Payment*

##### A. *Application for Payment*

1. After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other

indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

##### B. *Review of Application and Acceptance*

1. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

##### C. *Payment Becomes Due*

1. Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

#### 14.08 *Final Completion Delayed*

A. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not

fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

#### 14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

### ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

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#### 15.01 *OWNER May Suspend Work*

A. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in paragraph 10.05.

#### 15.02 *OWNER May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);

2. CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR's disregard of the authority of ENGINEER; or

4. CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.



C. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

#### 15.03 *OWNER May Terminate For Convenience*

A. Upon seven days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

#### 15.04 *CONTRACTOR May Stop Work or Terminate*

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon

seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

### ARTICLE 16 - DISPUTE RESOLUTION\*

#### 16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

### ARTICLE 17 - MISCELLANEOUS\*

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#### 17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

#### 17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to

exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

#### 17.03 *Cumulative Remedies*

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

#### 17.04 *Survival of Obligations*

A. 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 or termination or completion of the Agreement.

#### 17.05 *Controlling Law*

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

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## SUPPLEMENTARY CONDITIONS

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## SUPPLEMENTARY CONDITIONS

### AMENDMENTS TO GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

#### ARTICLE I. DEFINITIONS AND TERMINOLOGY

Add the following language at the beginning of definition I.QI A.12 entitled "Contract Documents" in the General-Conditions:

"The Advertisement for Bids, Instructions to Bidders, State Regulations, ..."

Delete the words "The individual or entity named as such in the Agreement" in 1.01.A.19 and insert the following in their place:

"The individual or entity duly appointed by the Owner to undertake the duties and powers herein assigned to the Engineer, acting either directly or through duly appointed representatives."

Delete the words "and who is identified as such in the Supplementary Conditions" at the end of definition 1.01 A.20, entitled "ENGINEER'S Consultant."

Delete definition 1.01 A.41 entitled "Specifications" in the General Conditions in its entirety and insert the following in its place:

"Sections included under Division 1 through Division 16 of the Contract Documents:"

#### ARTICLE 2. PRELIMINARY MATTERS

##### SC-2.05

Delete paragraph 2.0SC of the General Conditions in its entirety and insert the following in its place:

"C. Evidence of Insurance: CONTRACTOR shall deliver to OWNER, with a copy to the ENGINEER, Certificates of Insurance within 10 days after receipt of the notice of the acceptance of bid (and other evidence requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with the requirements of Article 5."

ARTICLE 3. CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE  
SC-3.0

Add the following sentence at the end of Paragraph 3.01A of the General Conditions:

"...by all. Each and every provision of law and clause 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."

ARTICLE 4. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS;  
REFERENCE POINTS

SC-4.02

Delete the term "Supplementary Conditions" of paragraph 4.02 A of the General Conditions and replace it with "Contract Documents".

SC-4.04

Change "of" to "or" on line 6 of paragraph 4.04 B.2 of the General Conditions. Delete the following words from lines 8 and 9 of paragraph 4.04 B.2 of the General Conditions:

"...Or not shown or indicated with reasonable accuracy..."

SC-4.05

Add a new paragraph immediately after paragraph 4.05A of the General Conditions which is to read as follows:

B. ENGINEER may check the lines elevations and reference marks set by CONTRACTOR, and CONTRACTOR shall correct any errors disclosed by such check. Such a check shall not be considered as approval of CONTRACTOR'S work and shall not relieve CONTRACTOR of the responsibility for construction of the entire Work in accordance with the Contract Documents. CONTRACTOR shall furnish personnel to assist ENGINEER in checking lines and grades."

SC-4.06

Delete the term Supplementary Conditions in paragraph 4.06A of the General Conditions and replace it with "Contract Documents".

ARTICLE 5. BOND AND INSURANCE

NOTICE TO CONTRACTOR:

1. Proof of Insurance coverage shall be furnished to the OWNER in accordance with the schedule for submittal of Bonds and Agreements.
2. Additionally refer to Article 2. PRELIMINARY MATTERS, Paragraph SC-2.05.C

SC-5.01

Insert these sentences following SC-5.01.A: The Surety Company providing the bonds shall have a rating of A or better within the Best Key Rating Guide and be licensed by the Massachusetts Division of Insurance. The contractor shall pay the premiums for such Bonds.

SC-5.03

Delete the second sentence following SC-5.03.A: of the General Conditions, which beings "OWNER shall deliver to..."

SC-5.04

The limits of liability for the insurance required by paragraph 5.04A of the General Conditions shall provide coverage for not less than the following amounts or greater where required by law:

5.4 A.1 and 5.04 A.2 Worker's Compensation

(1) Worker's Compensation	Statutory Requirements
(2) Coverage B - Employer's Liability	\$100,000/\$500,000/\$100,000

5.04 A.3, 5.04 A.4, and 5.04 A.5 Commercial General Liability Limits shall include Coverage for... independent Contractors, Personal Injury, Owners and Contractors Protective Liability, Explosion, Underground and Collapse, Broad Form Property Damage, Blanket Contractual Liability per locations/project endorsement.

Commercial General Liability	\$1,000,000/\$2,000,000
Products/completed Operations	\$2,000,000 Aggregate

5.4 A.6 Automobile Liability for owned, hired and non-owned vehicles:

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

*The following indemnity agreement: shall be made part of this contract:*

1.To the fullest extent permitted by law, Contractor(s) hereby acknowledges and agrees that it shall indemnify, hold harmless and defend the Engineer, the Owner, the Engineer and any of their officers, directors, employees, agents, affiliates, subsidiaries and partners from and against all-claims, damages, losses and expenses, including but not limited to, attorney's fees, arising out of or resulting from the performance of the contractor's work under this contract, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury to or destruction of tangible property (other than to the work itself) including loss of use resulting therefrom, and (2) is (CAUSED) in whole or in part by any

negligent acts omissions of the contractor, its employees, agents or contractors or anyone directly or indirectly employed by any of them, or anyone whose acts any of them may be liable.

2. The Contractor hereby acknowledges its obligation under the foregoing paragraph to indemnify the Engineer and Owner against judgments suffered because of the contractor's work and to assume the cost of defending the Engineer and Owner against claims as described in the foregoing paragraph.

A. Engineer and Owner shall be named as Additional Insured on contractors General Liability and Umbrella Liability Contractors.

The Contractual Liability required by paragraph s.04n.4 of the General Conditions shall provide coverage for not less than the following amounts:

- |  |   |
|--|---|
| (1) Bodily injury:   | \$1,000,000 Each occurrence<br>\$1,000,000 Annual aggregate |
| (2).Property damage, including explosion, collapse and underground coverage: | \$1,000,000 Each occurrence<br>\$1,000,000 Annual aggregate |

SC-5.04

Add two new paragraphs immediately after paragraph-5.04B of the General Conditions, which are to read as follows:

"C. The CONTRACTOR shall also provide:

1. CONTRACTOR shall, as a minimum, purchase and maintain excess liability insurance in the umbrella form with a combined single limit of not less than \$5,000,000 per claim and in the aggregate. Evidence of such excess liability shall be delivered to OWNER in accordance with paragraph 2.0SC in the form of a certificate indicating the policy numbers and limits of liability of all underlying insurance.

A. General Liability, Workers' Compensation, Automobile Liability and Umbrella Liability Policies will contain waivers of subrogation in favor of the Engineer and Owner.

2. If the aggregate limits of liability indicated in CONTRACTOR' insurance provided in accordance with paragraphs 5.03 and 5.04 are not sufficient to cover all claims for damages arising from his operations under this Contract and from any other work performed by him or if policies of insurance do not provide that the aggregate limits of liability for bodily injury and property damage apply to each contract or project separately, CONTRACTOR shall have such policies amended so that the aggregate limits of liability required by this Contract will be available to cover all claims for damages due to operations under this Contract."

SC-5.05

Delete paragraph 5 .05 of the General Conditions in its entirety.



SC-5.06

Delete Paragraph 5.06 A of the General Conditions in its entirety and insert the following in its place:

"A. CONTRACTOR shall purchase and maintain, until final payment, property insurance upon the Work at the site in an amount equal to the total bid price for the completed construction. This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEERS consultants in the Work, shall insure against the perils of fire and extended coverage, shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and shall include damages, losses and expenses rising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). This insurance shall be provided on the completed value form.' If not covered under the "all risk" insurance or otherwise provided in these Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment." A \$20,000 deductible shall be acceptable. Any other deductible amount shall be approved in advance by the OWNER and any deductible amount shall be borne by the CONTRACTOR.

Delete paragraph 5.068 of the General Conditions in its entirety.

Delete Paragraph 5.06C of the General Conditions in its entirety and insert the following in its place:

"C. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER by certified mail and will contain waiver provisions in accordance with paragraph 5.078. The words "**Endeavor** to" shall be struck from the Certificate Of Insurance in the Cancellation Statement"

Delete paragraph 5.06D of the General Conditions in its entirety.

Delete paragraph 5.06E of the General Conditions in its entirety.

SC-5.07

Amend the last sentence of paragraph 5.07A of the General Conditions by striking out the words "held by OWNER as trustee or." As so amended, paragraph 5.07A remains in effect.

SC-5.08

Delete paragraph 5.08A of the General Conditions in its entirety.

Delete paragraph 5.0813 of the General Conditions in its entirety.

SC-5.09

Delete paragraph 5.09A of the General Conditions in its entirety and insert the following in its place:

"A. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with this Article 5 on the basis of its not complying with the Contract Documents, OWNER will notify CONTRACTOR in writing thereof within thirty days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.0SC. CONTRACTOR will provide such additional information in respect of insurance provided by him as OWNER may reasonably request."

ARTICLE 6. CONTRACTOR'S RESPONSIBILITIES

SC-6.01

Delete paragraph 6.01B of the General Conditions in its entirety and replace with the following:

"B. At the site of the Work the CONTRACTOR shall employ a full-time construction superintendent or foreman who shall have full authority to act for the CONTRACTOR. It is understood that such representative shall be acceptable to the ENGINEER and shall be one who will be continued in the capacity for the particular job involved unless the representative ceases to be on the CONTRACTOR'S payroll. If at any time during the Work the representative is deemed by the ENGINEER to be no longer acceptable, the representative shall be promptly replaced by the CONTRACTOR. All communications to the superintendent shall be as binding as if given to the CONTRACTOR."

SC-6.04

Add the following paragraph after paragraph 6.04 A.2 of the General Conditions: -

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

SC-6.17

In paragraph 6.17 E.1 of the General Conditions, delete the word "timely" from the first line.

SC-6.20

Delete paragraph 6.20A of the General Conditions in its entirety and replace with the following:

"A. To the fullest extent permitted by law, the CONTRACTOR shall indemnify and hold harmless the OWNER, the ENGINEER, ENGINEER'S consultants, and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys fees, arising out of or resulting from the 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 therefrom, but only to the extent caused in whole or in part by 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 apply to any such claims, damages, losses and expenses which arise and/or are incurred by any person or entity either during the performance of the Work and/or alter completion of construction. Nothing in this paragraph shall be construed to negate, abridge, or reduce other rights or obligations of indemnity or contribution which would otherwise exist as to a party or person indemnified hereunder. CONTRACTOR hereby assumes the responsibility and liability for injury to or death of any and all persons, including the. CONTRACTOR's employees, and for any and all damage to property caused by, resulting from, or arising out of any act, omission or neglect on the part of the CONTRACTOR, or of any Subcontractor or of anyone directly or indirectly employed by any of them or of anyone for whose acts, any of them may be liable."

Delete paragraph 6.20C of the General Conditions in its entirety.

#### ARTICLE 8. OWNER'S RESPONSIBILITIES

##### SC-8.06

Delete paragraph 8.06A of the General Conditions in its entirety.

#### ARTICLE 9. ENGINEER'S STATUS DURING CONSTRUCTION

##### SC-9.01

Add a new paragraph 9.0113 after paragraph 9.01A of the General Conditions, which is to read as follows:

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

#### ARTICLE 11. COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

Delete Article 11 of the General Conditions in its entirety and replace with the following:

"A. The unit price of an item of Unit Price work shall be subject to reevaluation and adjustment under the following conditions:

(1) If the total extended bid price [Estimated Quantity times the Bid Unit Price] of a particular item of Unit Price Work amounts to 5 percent or more of the Original Contract Price and the variation in the quantity of the particular item of Unit Price Work performed by CONTRACTOR differs by more than 15 percent from the estimated quantity of such item indicated in the Agreement;  
and

(2) If there is no corresponding adjustment with respect to any other item of work; and

(3) If CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11- if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed. If OWNER believes that the quantity variation entitles OWNER to an adjustment in the unit price, OWNER shall be entitled to an adjustment in the unit price in an amount determined by the ENGINEER. ENGINEER shall not be liable in connection with any determination relating to adjustments which is rendered in good faith."

## ARTICLE 12. CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

### SC-12.06

Add the following new paragraphs after paragraph 12.06 of the General Conditions:

"12.07 Liquidated Damages:

A. If the CONTRACTOR shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the OWNER, then the CONTRACTOR does hereby agree, as a part consideration for the awarding of this Contract, to pay to the OWNER the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contract shall be in default after the time stipulated in the Contract for completing the work. Such damages may be retained from time to time by the OWNER from progress payments or any amounts owing to the CONTRACTOR, or otherwise collected.

B. The said amount is fixed and agreed upon by and between the CONTRACTOR and the OWNER because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the OWNER would in such event sustain, and said amount is agreed to be the amount of damages which the OWNER would sustain and said amount shall be retained from time to time by the OWNER from current periodical estimates.

C. It is further agreed that time is of the essence of each and every portion of this Contract and of the specifications wherein as definite and certain length of times is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Contract. Provided that the CONTRACTOR shall not be charged with liquidated damages of any excess cost when the OWNER determines that the CONTRACTOR is without fault and the CONTRACTOR'S reasons for the time extension are acceptable to the OWNER; Provided, further, that the CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

1) to any preference, priority or allocation order duly issued by the Government;

2) to unforeseeable cause beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and

3) to any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections C(1) and C(2) above;

D. Provided, further, that the CONTRACTOR shall, within ten (10) days from the beginning of such delay, unless the OWNER shall grant a further period of time prior to the date of final settlement of the Contract, notify the OWNER, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the CONTRACTOR within a reasonable time of its decision in the matter."

#### ARTICLE 13. TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

##### SC-13.07

Delete paragraph 3.07A of the General Conditions and insert the following in its place:

"A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) correct such defective work, or, if it has been rejected by OWNER, remove it from the site and replace it with work that is not defective, and (ii) satisfactorily correct or remove and replace any damage to other work or the work of others therefrom. If CONTRACTOR does not begin the repairs ten (10) days of receipt of written notification and promptly comply with the terms of OWNER's written instructions, or in an emergency when delay would cause serious risk, loss or damage, OWNER may have the defective work corrected or the rejected work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR."

##### SC-13.09

Revise paragraph 13.09A of the General Conditions

A. Delete the word "seven" and replace it with the word "ten" so that it reads "after ten days written notice to CONTRACTOR."

#### ARTICLE 14. PAYMENTS TO CONTRACTOR AND COMPLETION

##### SC-14.02

Delete paragraph 14.02A.3 and insert the following in its place:

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

Add Paragraph 4. to read as follows:

"4. The CONTRACTOR shall submit Weekly Payroll Records Report and Statement of

Compliance verifying compliance with the Minimum Prevailing Wage Law, MGL ch. 149, Sections 26-27H. "These Statements of Compliance shall be submitted as a condition of payment for work performed during the period the reports apply."

#### SC-14.03

Delete paragraph 14.03A in its entirety and insert the following in its place:

"A CONTRACTOR warrants and guarantees that title to all work, material and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than at the time of Application for Payment free and clear of all liens. CONTRACTOR shall provide written transfer of title and a certified paid invoice provided by the supplier."

### ARTICLE 15. SUSPENSION OF WORK AND TERMINATION

#### SC-15.02

Add a new paragraph immediately after paragraph 15.02 AA of the General Conditions which is to read as follows:

"5. If the Work to be done under this Contract shall be abandoned, or if this Contract or any part thereof shall be sublet, without the previous written consent of OWNER, or if the contract or any claim thereunder shall be assigned by CONTRACTOR otherwise than as herein specified;"

### ARTICLE 17. MISCELLANEOUS

#### SC-17.06, 17.07, 17.08, 17.09

Add the following new paragraphs after paragraph 17.05 of the General Conditions:

"17.06 Assignment:

A. The CONTRACTOR shall not assign the whole or any part of this Contract or any moneys due or to become due hereunder until thirty (30) days prior notice in writing has been given to the OWNER of the intention to assign, which notice shall state the identity and address of the prospective assignee. No assignment shall be made without the OWNER's prior written consent. Such consent shall not be unreasonably withheld. In case the CONTRACTOR assigns all or any part of the moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the CONTRACTOR shall be subject to prior claims of all persons, firms and corporations of services rendered or materials supplied for the performance of the work called for in this Contract."

#### 17.7 Liability

It is understood and agreed that members of the OWNER or the ENGINEER' or any agent or employees of the OWNER signing this Agreement shall not be personally liable hereunder for any action incurred in connection with this Agreement.

#### 17.8 State Statutes and Regulations

See Superseding Changes To General & Supplementary Conditions 12/29/04 for further modifications of the General Conditions due to state statutes and regulations.

#### 17.9 Severability

If any provision of this Agreement shall be invalid or unenforceable to any extent or in any application, then the remainder of this Agreement and of such terms and conditions, except to such extent or in such application, shall not be affected thereby, and each and every term and condition of this Agreement shall be valid and enforced to the fullest extent and in the broadest application permitted by law."

END OF SECTION

**STATE STATUTES AND REGULATIONS  
COMMONWEALTH OF MASSACHUSETTS**

A. REVISIONS TO GENERAL CONDITIONS

1. Definitions
2. Subsurface Conditions Found Different
3. Subcontracting
4. Permits
5. Contractor Records
6. Massachusetts Sales and Use Tax I
7. Clarifications and Interpretations
8. Change of Contract Price
9. Payments
10. Suspension of Work and Termination
11. Labor Classification and Minimum Wage Rates

B. OTHER REGULATORY REQUIREMENTS

1. Working Hours
2. DEP Community Sound Level Criteria

ATTACHMENT A – Wage Rates

ATTACHMENT B

Excerpts from Chapter 149 and Chapter 30 of the Massachusetts General Law

ATTACHMENT C - (not used on this project)

Special Provisions for Minority/Women Business Enterprises and the Commonwealth of Massachusetts Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program.

ATTACHMENT D--

Change Orders



A. REVISIONS TO GENERAL CONDITIONS:

1. Definitions

The term "AWARDING AUTHORITY," as used herein, shall be considered to be synonymous with the term "OWNER," described in definition 1.01 A.30.

Delete definition 1.01 A.43 entitled "Substantial Completion" in the General Conditions in its entirety and insert the following in its place:

"Substantial Completion shall be interpreted in accordance with Massachusetts General Law Chapter 30, Section 39G or -39K as appropriate."

2. Subsurface Conditions Found Different

Add the following sentence to the end of paragraph 4.03A of the General Conditions:

"...to do so. Adjustments resulting from subsurface or latent physical conditions will be in accordance with Massachusetts General Law Chapter 30, Section 39N."

3. Subcontracting

Add the following language at the end of paragraph 6.06F of the General Conditions:

"Except as required otherwise by Massachusetts General Law Chapter 149, Section 44F, for Work governed by Chapter 149, sections 44A through 44H."

4. Permits

Delete paragraph 6.08A of the General Conditions in its entirety and insert the following in its place:

"A. The AWARDING AUTHORITY shall be responsible for identifying and obtaining all federal, state, and local permits required by the nature and location of construction, including but not limited to railroad permits, building construction permits, and permits for street and highway cuts and openings. CONTRACTOR shall be responsible for obtaining all permits required of his equipment, work force, or particular operations (such as blasting) in the performance of the Work and not otherwise specified to be obtained by the AWARDING AUTHORITY. These permit fees shall be paid by CONTRACTOR. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of bids, or, if there are no Bids, on the Effective Date of the Agreement."

5. Contractor Records

Add a new paragraph immediately after paragraph 6.09C of the General Conditions, which is to read as follows:

"D. The CONTRACTOR shall comply with all applicable provisions Chapter 30, Section 39R of the Massachusetts General Laws Regarding, CONTRACTOR'S records."

6. Massachusetts Sales and Use Tax

Add the following paragraph after paragraph 6.10A of the General Conditions:

"B. The material and supplies to be used by the CONTRACTOR in the Work of this Contract are exempt from the Sales and Use Tax of the Commonwealth of Massachusetts. The AWARDING AUTHORITY tax exemption certificate number will be furnished to the CONTRACTOR."

7. Clarifications and Interpretations

Add the following language at the end of paragraph 9.04A of the General Conditions:

"The ENGINEER'S interpretation will be made in accordance with the requirements of Massachusetts General Law Chapter 30, Section 39P."

8. Change of Contract Price

Delete paragraphs 11.01, 11.02, and 12.01 of the General Conditions, having to do with Change of Contract Price. Changes in contract price will be governed by the section called "Change Orders" in Attachment D, Section XXX and Article 11 in the Supplementary Conditions.

9. Payments

Delete paragraph 12.028.1 of the General Conditions, in its entirety and insert the following in its place:

"1. Progress Payments will be made in accordance with the Massachusetts General Law Chapter 30, Section 39G or 39K, as applicable."

Add the following new paragraph following paragraph 14.02C.1 of the General Conditions:

"2. The CONTRACTOR shall make payments to Subcontractors in accordance with the requirements of Massachusetts General Law Chapter 30, Section 39F."

Delete paragraph 14.07B of the General Conditions in its entirety and insert the following in its place:

"1. If, on the basis of the ENGINEER's observation of the Work during construction and final inspection and, upon the ENGINEER's review of the final Application for Payment and accompanying documentation, the ENGINEER is satisfied that the Work has been completed and that the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will indicate in writing his recommendation of payment and present the Application to the AWARDING AUTHORITY for payment. Thereupon the ENGINEER will give written notice to the AWARDING AUTHORITY and the CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.15. Otherwise, the ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment. In such case the CONTRACTOR shall make the

necessary corrections and resubmit the Application. If the Application and accompanying documentation are appropriate as to form and substance, the AWARDING AUTHORITY shall in accordance with the applicable Massachusetts General Law, pay the CONTRACTOR the amount recommended by the ENGINEER."

10. Suspension of Work and Termination

Delete paragraph 15.01A of the General Conditions in its entirety and insert the following in its place:

"A. The AWARDING AUTHORITY may order, at any time and without cause, the CONTRACTOR to suspend or delay the Work in accordance with Massachusetts General Law Chapter 30, Section 39-0."

11. Labor Classifications and Minimum Wage Rates

Add the following paragraphs under the heading "Wage Rates" after paragraph 17.10 of the Supplementary Conditions:

"17.11 Wage Rates

- A. Minimum wage rates as determined by the Commissioner of the Department of Labor and Industries under the provisions of Massachusetts General Laws Chapter 149, Sections 26-270 apply to this project. A copy of the wage schedule is included in the front end of the specifications under Federal Minimum Wage Rates. If, after the Notice of Award, it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the Commissioner. Such approved minimum rate shall be retro- active to the time of the initial employment of such person in such trade or occupation. The CONTRACTOR shall notify the AWARDING AUTHORITY of its intention to employ persons in trades or occupations not classified in the wage determinations as soon as possible in order to allow sufficient time for the AWARDING AUTHORITY to obtain approved rates for such trades or occupations.
- B. The schedule of wages referred to above are minimum rates only, and the AWARDING AUTHORITY will not consider any claims for additional compensation made by CONTRACTOR because of payment by the CONTRACTOR of any wage rate in excess of the applicable rate contained in the Contract.
- C. The said schedule of wages shall continue to be the minimum rates to be paid during the life of this Agreement and a legible copy of said schedule shall be kept posted in a conspicuous place at the site of the Work.
- D. CONTRACTOR and subcontractors shall submit a copy of weekly payroll records to the AWARDING AUTHORITY and the AWARDING AUTHORITY shall retain the records of a minimum of three years."

B. OTHER REGULATORY REQUIREMENTS:

1. Working Hours

No laborer, workman, mechanic, foreman, or inspector, working within the Commonwealth, in the employ of the CONTRACTOR, subcontractor, or other person doing or contracting to do the whole or a part of the work contemplated by this contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.

2. DEP Community sound Level Criteria

The Community Sound Level Criteria as established by the Commonwealth of Massachusetts Department of Environmental Protection (DEP) must be conformed to prior to the AWARDING AUTHORITY's acceptance of the structure. The following sound level criteria must be met at the construction site:

- A. The increase in the broad band noise level shall not be in excess of ten (10) dB(A) above ambient at the station boundary. The ambient level is defined as the A-weighted noise level that is exceeded ninety (90) percent of the time measured during the period in question.
- B. The primary noise source(s) shall not produce a puretone condition. Puretone is any given octave band center frequency that exceeds the two adjacent center frequencies by three (3) or more decibels.

END OF SECTION

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**SUPERSEDING CHANGES TO  
GENERAL AND SUPPLEMENTARY CONDITIONS**

1. GENERAL CONDITIONS

2.06A - insert at end: Said conference shall be scheduled and arranged by the Contractor. I

4.01B - delete

4.06G - delete

5.07B - delete

6.17E - restore the word "timely" in the first line. Delete the word "only" from the 5" line. Where "only" has been deleted, insert "to determine their general conformance with the contract documents, in accordance with good and accepted engineering practices, and".

8.02A - delete "to whom contractor makes no reasonable objection".

9.02A - Insert, after "Work" in the 6" line, "While construction is active at the project, said visits and inspections will take place at least once per week."

12.06 - delete subparts A and B, and replace with the following: "The Contractor hereby agrees that the Contractor shall have no claim for damages of any kind against the Owner or the Engineer on account of any delay in the commencement of the Work and/or any delay in, or suspension of any portion of the Work, whether such delay is caused by the Owner, the Engineer, or otherwise. 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 these general conditions.

No claims shall be allowed on account of the failure of the Engineer to furnish Drawings, specifications or instructions or to return Shop Drawings or Samples until the expiration of the applicable time period referenced in Mass. Gen. L. c. 30, §39P, and not then unless such claim be reasonable.

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

14.02C - change "Ten" to "Twenty-One"

14.07A(3) - delete the first three lines through the word "Owner,". In the third line, after Contractor, substitute "shall" for "may". In the fourth line, after the word "full" insert "on behalf of both Contractor and all of its Subcontractors,".

14.09A(1) - delete -

15.03B - add after "termination" ", with respect to this project or any other project of the Contractor."

Add "15.03C. If this Contract is terminated by Owner with or without cause, and regardless of whether said termination is rightful or wrongful, in no event shall the Contractor be paid a sum which, together with prior payments to Contractor, exceeds the sum payable to Contractor under the Agreement (Section 00520), as adjusted by any agreed change orders.

## II. SUPPLEMENTARY CONDITIONS

### Article V - Bonds and Insurance

Employer's liability coverage must be \$2 million per accident, \$2 million disease limits, and \$2 million per employee disease limits.

General liability insurance limits must be \$5 million aggregate, \$2 million dollars' products/completed operations aggregate; \$2 million personal injury and advertising; and \$2 million per occurrence.

The contractual liability insurance coverage must have limits corresponding to the foregoing. At 5.04A.6, the following changes should be made to paragraph I of the indemnity clause: four lines from the bottom, the parenthesis should be removed from the word "CAUSED" and the word "CAUSED" should be changed to lower-case (caused). Also, in the last line of said clause, insert the word "for" after the word "anyone."

At SC-5.04C 1 - insert the following sentence at the end: "The Contractor's excess liability insurance coverage must follow from with its underlying liability coverages."

SC-6.20A - insert the word "defend" after the word "shall" in the first line.

SC-14.02A.3 - insert the following sentence at the end: "Retainage for the entire project will be withheld until substantial completion of the entire project, at which time retainage shall be accounted for, subject to all of the other terms and conditions of payment at the time of substantial completion.

Add the following Article SC-18.

### SC-I 8 Arbitration - J

18.1 Controversies and Claims Subject to Arbitration. Any Claim arising out of or related to the Contract, or the breach thereof, except claims relating to aesthetic effect, shall be settled by arbitration, subject to the provisions of Subparagraph 18.7. Arbitration will be conducted 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. In any such arbitration in which the amount stated in the demand is \$100,000 or less, a single arbitrator shall be appointed in accordance with the procedures set forth in the American Arbitration Association Construction Industry Arbitration Rules. In any such arbitration in which the amount stated in the demand is in excess of \$100,000, a panel of three arbitrators shall be appointed in accordance with the procedures set forth in the American Arbitration

Association Construction Industry Arbitration Rules. The parties may agree to use any arbitration service. In the absence of such agreement, the American Arbitration Association shall be utilized.

18.2 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. The arbitration panel shall have all 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:

18.2.1 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.

18.2.2 After the neutral arbitrator has been appointed, neither party may engage in ex parte communication with the arbitrator appointed by that party.

18.2.3 Contract Performance During Arbitration. During arbitration proceedings, the Owner and Contractor shall otherwise continue their performances hereunder.

18.3 When a written decision of the Engineer states that the decision is final, any demand for arbitration of the matter covered by such decision must be made within two months after substantial completion of the project, as determined by the Engineer in accordance with the provisions hereof. The failure to demand arbitration within said two month period will result in the Engineer's decision becoming final and binding upon the Owner and the Contractor.

18.4 A Demand for arbitration shall be made with the time limits specified in Subparagraph 18.3, and in no event shall 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.

18.5 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.

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

18.7 Notwithstanding any provision contained in this Paragraph 18 or elsewhere in the Contract Documents, the Owner reserves the following right in connection with claims and disputes between the Owner and Contractor:



1. the right to institute the legal action against the Contractor in any court of competent jurisdiction in-lieu of demanding arbitration pursuant to this paragraph 18, in which case the dispute or disputes which are the subject of such action shall be decided by such court, and not by arbitration.

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;

3. the right to require the Contractor to join as a party in any arbitration between the Owner and Architect relating to the Project in which case the Contractor agrees to be bound by that decision of the arbitrator arbitrators in such arbitration.

In case the Owner elects to proceed in accordance with 18.7.1 or 18.7.2 above, the word "litigation", shall be deemed to replace the word "arbitration" wherever the latter word appears in the Contract Documents.

SC-19 MBE and WBE participation

The Contractor shall comply with the provision of G.L.c. 7 40N, and any associated regulations effective during the time of the project, relative to the participation of minority and women-owned businesses in connection with the project. At present, the current participation goals are 7.4% MBE and 4% WBE.

END OF SECTION

## EQUAL OPPORTUNITY REQUIREMENTS

### 1. EQUAL EMPLOYMENT OPPORTUNITY

A. Equal Employment Plan: The Contractor and each Subcontractor shall implement an effective affirmative action plan to assure equal employment opportunity throughout the performance of work on this project. Do not discriminate against any employee or applicant for employment because of race, color, sex, religion, age, or national origin. Affirmative action plan shall include, but not be limited to, the following:

1. Employment, upgrading, demotion, or transfer.
2. Recruitment or recruitment advertising.
3. Layoff or termination.
4. Rates of pay or other forms of compensation.
5. Selection for training, including apprenticeship.

B. Rules and Regulations: The Contractor and each Subcontractor shall comply with all applicable local, state and federal laws and regulations regarding equal employment opportunity and with the provisions of the following:

1.. Governors "Executive Order No. 74", dated July 20, 1970, entitled the "Governor's Code of Fair Practices", as amended by the Governor's Executive Order No. 116, dated May 1, 1975.

2. The Fair Employment Practices Law of the Commonwealth, Chapter 1518 of the General Laws of Massachusetts, as amended.

3. The rules and regulations of the Massachusetts Commission Against Discrimination as in force at the date of the Contract.

4. The rules, regulations and relevant orders of the United States Secretary of Labor, the Commonwealth of Massachusetts Department of Labor and Industries, and other authorities having jurisdiction as in force at the date of the Contract.

5. Governor's 'Executive Order No. 237'.

C. Employment Advertisements: State in all solicitations or advertisements for employees that all qualified applicants will receive consideration for employment without regard to race, color, sex, religion, age, or national origin.

D. Referral Notices: Direct special effort toward the recruitment of minority workers through the unions and through referral agencies representing the minority community.

E. Advising Labor Unions: Send to each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the Contractor's equal employment opportunity commitment and post copies of these notices in conspicuous places available to employees and applicants for employment.

F. Posting: Post copies of equal opportunity employment notices in conspicuous places available to employees and applicants for employment and post notices setting forth the provisions of this non-discrimination equal employment opportunity clause.

G. Manning Table: Assume and be responsible for the affirmative duty of achieving the range of minority employment and women work force participation set forth in a manning table for the entire project. Submit a manning table at the request of the Owner and obtain Owners approval prior to the Award of Contract.

H. Percentage Participation: Both Contractor and Sub-contractor shall comply with requirements of Minority and Women Business percentage of Contract percentage participation requirements specified in the Minority and Women Business Enterprise Set Aside Requirements Section.

END OF SECTION

**MINORITY AND WOMEN BUSINESS  
ENTERPRISE SET ASIDE REQUIREMENTS**

1. GENERAL

A. All provisions of the Contract Documents shall be subject to all applicable provisions of law, including, without limitation, Federal, State, and Local statutes and ordinances regarding setting aside a portion of the Contract for qualified Minority and Women Business Enterprises. The Contractor shall recognize that other duties and obligations are required by laws, statutes, and ordinances which may not be provided herein, but must be considered and made a part of this Contract. In case of a conflict between the Contract Documents and applicable laws, statutes, and ordinances, the provisions of law, statutes, and ordinances shall *govern*.

2. MINORITY AND WOMEN OWNED BUSINESS ENTERPRISE SET ASIDE REQUIREMENTS

A. Requirements For minority and women business enterprise set aside requirements, provided to the Architect by the Awarding Authority Follow. The Architect does not warrant or guarantee the completeness or accuracy of this information, and every bidder and contractor shall be responsible for ascertaining the MWBE set aside requirements in the area where the work will be performed.

1. Bidders shall agree to contract with minority and women owned businesses as certified by the State Office of Minority and Women Business Assistance [SOMWBA]. "the amount of participation which shall be reserved for such enterprises shall not be less than fifteen percent [15%] of the total contract amount including accepted alternates, of which at least ten percent [10%] shall be reserved for minority business enterprises and five percent [5%] shall be reserved for womenowned business enterprises.

2. The Contractor and each Subcontractor shall furnish to the Awarding Authority, within fifteen days after completion of its portion of the work, a certified 'Statement of Compliance' certifying compliance with minority and women business enterprise set aside requirements. Submit the 'Statement of Compliance' in a form acceptable to the Awarding Authority.

3. See Massachusetts Executive Order 237 as amended.

END OF SECTION

MINORITY AND WOMEN BUSINESS ENTERPRISE SET ASIDE REQUIREMENTS

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## INSURANCE REQUIREMENTS

### 1. GENERAL

A. This section specifies the Owner's requirements for insurance and relates to the General Conditions of the Contract for Construction and Supplementary Conditions of the Contract for Construction.

B. Provisions of the General Conditions of the Contract for Construction and Supplementary General Conditions of the Contract for Construction, which are not modified by the following insurance Requirements, remain in full effect.

### 2. INSURANCE REQUIREMENTS

A. Insurance Limits: The insurance required should be written for not less than the limits of liability required by law or the following limits, whichever is greater: State and federal Workmen's Compensation Statutory Benefits required by union contract as required.

#### GENERAL LIABILITY\*

General Liability- Bodily Injury and Property Damage Each Occurrence	\$1,000,000.00
General Liability — Bodily Injury and Property Damage Aggregate	\$2,000,000.00

General Liability shall include coverage for the following:

- Comprehensive form
- Premise/Operations Liability
- Explosion, Collapse and Underground (XCU). Products/Completed Operations (aggregate limit \$2,000,000.00) Contractual Liability
- Independent Contractors Broad
- Form Property Damage
- Personal Injury Including Libel and Slander Coverage Broad
- Form CGL Endorsement

#### AUTOMOBILE LIABILITY\*\*

Comp. Automobile Liability** Bodily Injury and Property Damage Per Accident	\$1,000,000.00
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\*\*Provide coverage for All Owned, Non-Owned, and Hired vehicles.

#### EXCESS LIABILITY – Umbrella Form

Each occurrence	\$5,000,000.00
Aggregate	\$5,000,000.00

B. Exclusions: The Owner's property insurance shall not cover tools, equipment, shoring, staging, forms, temporary buildings or other equipment owned or rented by the Contractor, its Subcontractors, or any Worker.

C. Named Insured: Each Insurance policy certificate of insurance provided by the Contractor shall name the Town of Arlington as an additional insured. Each insurance policy and certificate of insurance provided by the Contractor shall contain a provision that the Owner shall be notified of cancellation or restrictive amendment at least thirty (30) days prior to the effective date of such cancellation or amendment.

D. Insurance Certificates: Submit insurance certificates for the Owner's review and approval prior to commencement of the work. The Contractor and all subcontractors who are required to provide insurance under the Contract shall provide accurate and bona fide "Certificates of insurance "issued by a responsible agent of the insurance company.

1. Certificate Content: Such "Certificates of Insurance" shall clearly indicate the insurance coverage. Each "Certificate of Insurance" shall be accompanied by a sworn and duly notarized statement from the responsible agent of the insurance company issuing the certificate clearly stating that all insurance specified and required by the Contract Documents is provided and in force, and also a clear statement of all exceptions and deviations, if any, from the Contract Document issuance requirements.

2. Responsibility: The insurance agent issuing and authorizing the "Certificate of Insurance" shall be responsible and liable for the accuracy and validity of the "Certificate of Insurance". Each insured party shall certify by sworn and duly notarized statement that the "Certificate of Insurance" issued for them are bona fide.

3. Disclaimers Prohibited: "Certificates of Insurance" shall not contain any disclaimers such as: "This Certificate is issued as a matter of information only and confers no right upon the certificate holder. This Certificate does not amend, extend, or alter the coverage afforded by the policies listed below." Disclaimers are not acceptable.

4. Certificates of Insurance Can Be Relied Upon: Parties receiving "Certificates of insurance" shall be entitled to rely upon the "Certificates of insurance" and shall have the right to claim the benefits and protection provided by the insurance as it applies to them.

5. Alternate to "Certificates of Insurance": Instead of providing the "Certificates of Insurance" and the sworn statements required above, the insured may provide bona fide and accurate copies of all insurance policies and riders accompanied by a sworn and duly notarized statement from the insured that the policies, riders, and documents submitted are bona fide and valid, and that parties receiving the insurance documents may rely on the documents as satisfaction of the Contract insurance requirements.

E. The Contractor shall provide "builder's risk" insurance as described in the General Conditions of the Contract for Construction and with limits equal to the full insurable completed value of the building under construction. The "Builder's Risk" insurance shall include "all risk" insurance for physical loss and damage including theft, vandalism, and malicious mischief. The "Builder's Risk" insurance shall be amended to delete any and all endorsements relating to cancellation of the policy due to partial occupancy by the Owner.

1. Builder's Risk Deductible Amount: \$1,000,000.00

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. The work to be done under this contract consists of construction of drainage improvements; porous hot mix path construction; existing boardwalk access retrofit; restoration seeding and planting; installation of bench and picnic table site amenities; naturalistic seating and play area installation; placing of landscape boulders; limited tree removal; installation of granite curbing; and all associated work as indicated on the Contract Documents. **\*\*All work will be completed in a high pedestrian traffic area within Wellington Park.** Contractor must work closely with the Owner to ensure that the site is secure and impacts to public use of the Park are minimized. All work must be completed by September 30, 2021, with the exception of work to be completed during the maintenance and guarantee period (planting and invasive removals).

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:

BASE BID ITEMS:

1. Paving improvements, including installation of porous hot mix asphalt paving (no underdrain).
2. Drainage improvements, including a sediment forebay and bioretention basin with a vegetated conveyance swale.
3. Access retrofit improvements to existing timber boardwalk.
4. Remove targeted invasive plant species.
5. Landscape improvements, including new seating and exploration area, picnic table, placed boulders, restoration planting, sodding and seeding.

ADD ALTERNATE ITEMS:

1. None.

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 and to such drawings in explanation of details, or as may be furnished by the Owner's Representative 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 Owner's Representative, 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.
- F. Review and comply with all requirements of the Town of Arlington Order of Conditions and MWRA 8m Permit (see Appendix A).

#### 1.02 CONSTRUCTION SEQUENCE

- A. The following is a construction sequence containing work elements and is based on major aspects of Work for illustration purposes only. The Contractor shall not assume that all elements of Work are included herein. Work on some of the items may proceed concurrently, while others should proceed in the proposed sequence before commencing or completing the Work. The actual contract work sequence shall be ultimately defined by the Contractor subject to the approval of the Town and will be reflected in the Contractor's approved schedule.
  - 1. Mobilization, install construction fencing and Traffic and Pedestrian Management items, access to tennis courts shall remain open as indicated on Construction Documents.
  - 2. Establish and mark limit of work line.
  - 3. Install erosion and sediment control measures as shown in the Drawings and as outlined in Section 01568, Erosion and Sediment Control.
  - 4. Coordinate with Owner's Representative to protect trees to remain.
  - 5. Coordinate site visit with Conservation Commission Agent to approve installation of erosion and sediment control devices.
  - 6. Coordinate with Owner's Representative to protect trees to remain and tree

pruning. Remove and dispose of trees and invasive plants.

7. Grade bioretention basin and exploration area (to be completed prior to path work paving). **Existing porous asphalt surfacing shall be protected at all times.**
8. Remove and stockpile soil and boulders. Remove and dispose of bituminous concrete and excess soil.
9. Construct bioretention basin, sediment forebay, weirs, trench channel drain and conveyance swale (as shown on Sheet L-4).
10. Install footings and abutment curb for boardwalk access retrofit.
11. Install porous bituminous hot mix asphalt to final grades. Test all porous surfaces for infiltration (**protect porous hot mix asphalt paving and washed stone base material at all times**).
12. Prepare locations for exploration area wooden elements (wooden play elements and earth anchors NIC, by others).
13. Grade and place planting soil (**protect porous hot mix asphalt at all times**).
14. Install plantings, seeding and seed establishment fence (**to be completed by July 1<sup>st</sup>, 2021**).
15. Install site amenities.
16. Repair decking and handrail boards on Mill Brook bridge (complete any time).
17. Restore construction entrance areas and staging area.
18. Remove temporary erosion control measures as directed by Owner's Representative.
19. Provide maintenance guarantee items on all seeded areas and plantings.
20. Remove seed establishment fencing around seeded areas.
21. Perform vegetation management of targeted invasive species as noted in specification (ongoing).

### 1.03 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 are 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, to the satisfaction of its Owner.

#### 1.04 SITE PROTECTIONS

- A. Any damage to fencing or pavement outside of the limits of work, including fence replacement, pavement repair, etc., shall be fully borne by the Contractor. Repairs shall be immediately made by the Contractor as per the Contract Documents and as directed by the Owner's Representative.
- B. **Any costs to repair or replace damage to existing vegetation inside and outside of the limit of work shall be fully borne by the Contractor.** Repairs shall be immediately made by the Contractor as per the Contract Documents and as directed by the Owner's Representative.
- C. **Any costs to repair or replace damage to existing porous hot mix asphalt pavement inside and outside of the limit of work shall be fully borne by the Contractor.** Repairs shall be immediately made by the Contractor as per the Contract Documents and as directed by the Owner's Representative

#### 1.05 CONTRACTOR USE OF PROJECT SITE

- A. The Contractor shall determine the location(s) of staging area(s) and access to be used for this project and shall obtain approval of the location(s) from the Town prior to any mobilization activities.
- B. 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.

#### 1.06 LIST OF DRAWINGS

- A. The location, general characteristics, and principal details of the work are indicated on a set of drawings entitled "Wellington Park & Mill Brook Corridor Revitalization Project: Phase 3, Wellington Park - Arlington, MA, Bid Documents."
- B. The drawings listed 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 Owner's Representative, if found necessary, and shall then become a part of the Drawings.

END OF SECTION 01010

## SECTION 01060

### PERMITS AND REGULATORY REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. This Section provides specific information and defines specific requirements of the Contractor regarding the preparation and acquisition of permits required to perform the work of this Project. The permits and terminations required include, but are not limited to, those specifically described in this Section.
- B. The following items are addressed in this Section.
  - 1. Arlington Fire Department
  - 2. Arlington Department of Public Works
  - 3. Department of Safety Trench Permit
  - 4. National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities

##### 1.02 RELATED WORK

- A. Section 01110 – CONTROL OF WORK AND MATERIALS
- B. Section 01562 – DUST CONTROL
- C. Section 01568 – EROSION AND SEDIMENT CONTROL
- D. Section 02300 – EARTHWORK

##### 1.03 GENERAL PERMIT AND TERMINATION REQUIREMENTS:

- A. The Contractor shall apply for, obtain, and pay for all permits and licenses required, including but not limited to the permits listed below. Contractor shall also be responsible for all fees and costs associated with decommissioning and terminations of services.
- B. The Contractor shall procure all other permits, licenses, and approvals from Federal, State, and local authorities and such other agencies as may be necessary in connection with the work of this Contract.

- C. The Contractor shall perform the work in accordance with the Contract Documents, and any applicable Federal, State, and local requirements, and permits.
- D. The Contractor shall ensure that all necessary permits from the Department of Public Safety, Fire Department, Police Department, Department of Public Works, Recreation Department, 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.
- E. The Contractor shall provide all required certificates to show that the work has been completed in conformity with the permits and shall submit such Certificates of Approval to the Engineer before final acceptance of the work.
- F. 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.

1.04 ARLINGTON FIRE DEPARTMENT / ARLINGTON DEPARTMENT OF PUBLIC WORKS:

- A. The Contractor shall coordinate with the Arlington Fire Department and Arlington Department of Public Works related to hydrant usage for dust control and construction.

1.05 TRENCH PERMIT:

- A. The Contractor shall obtain a Trench Permit, in accordance with the Massachusetts Department of Safety regulations on excavation and trench safety (520 CMR 14.00), prior to excavations of all regulated trenches.
- B. In accordance with the Town of Arlington Street Occupancy & Trench Permit Regulations, licensed and approved contractors wishing to occupy or work in the Town's Right-of-Ways or perform work associated to any Town-controlled Utilities shall obtain a permit from the Department of Public Works prior to commencing work, unless otherwise specified in the Town's Street Occupancy & Trench Permitting Regulations.

1.06 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR DISCHARGES FROM CONSTRUCTION ACTIVITIES

- A. The Contractor shall obtain a NPDES General Permit for Discharges from Construction Activities from the EPA and prepare a Stormwater Pollution Prevention Plan (SWPPP).

1.07 PERMITS OBTAINED BY THE OWNER

- A. A list of permits that the Owner has obtained are listed below and a copy of the Conditions and Licenses are attached in Appendix "01060-A":

1. Massachusetts Wetlands Protection Act Order of Conditions as per the Town of Arlington Conservation Commission.
  2. Massachusetts Water Resources Authority 8m Permit.
- B. The Contractor is solely responsible for the implementation of the permit requirements and shall include as such in the Bid.
- C. The Contractor is solely responsible for any punitive action resulting from any violation of the permit.
- D. Contractor shall comply with all permits obtained by the Owner.

#### PART 2- PRODUCTS

Not Used

#### PART 3 – EXECUTION

Not Used

END OF SECTION 01060

APPENDIX 01060-A

At End of Document

## SECTION 01110

### CONTROL OF WORK AND MATERIALS

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

A. This section includes the following general requirements for the project:

1. Hours of Site Activity and Trucking Requirements
2. Contractor's Representative
3. Time for Completion of Contract
4. Project Signs
5. Hauling, Handling and Storage of Materials
6. Open Excavations
7. Maintenance of Traffic
8. Care and Protection of Property
9. Protection of Existing Structures
10. Maintenance of Flow
11. Rejected Materials and Defective Work
12. Sanitary Regulations
13. Safety and Health Regulations
14. Site Investigation
15. Electric Service
16. Water Service
17. Hazardous Waste
18. Clean-up and Disposal of Excess Material

#### PART 2 – PRODUCTS

Not Used

#### PART 3 – EXECUTION

##### 3.01. HOURS OF SITE ACTIVITY AND TRUCKING REQUIREMENTS

- A. The Contractor shall conduct all construction activity between 8:00 a.m. and 6:00 p.m., Monday through Friday. No construction work shall be allowed on Saturdays, Sundays or Holidays without written authorization from the Owner.
- B. The Contractor shall limit all construction-related trucking (which shall mean all trucking of construction materials, excavated materials, and demolition debris by vehicles over 18,000 pounds GVW) to and from the Site to the hours of 8:00 a.m. to 6:00 p.m. Monday through Friday, except holidays.



- C. The Contractor shall be responsible for scheduling any necessary police details with the Arlington Police Department. All detail officers will be paid by the Owner directly and fees should not be included in the Contractor bid prices.

### 3.02. CONTRACTOR'S REPRESENTATIVE

- A. The Contractor shall designate a representative who will be available to respond to emergency calls by the Owner at any time day and night and on weekends and holidays should such a situation arise.

### 3.03. TIME FOR COMPLETION OF CONTRACT

- A. The time for completion of this contract is stipulated in the FORM FOR GENERAL BID. The Bidder shall base his bid on completing the proposed work by the completion date stipulated in FORM FOR GENERAL BID.
- B. The General Contractor shall be responsible for coordinating his own work as well as that of any subcontractors. He shall be responsible for notification of the Engineer when each phase of work is expected to begin and the approximate completion date.

### 3.04. 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.
- B. The Contractor shall provide suitable and adequate storage for equipment and materials furnished by him that are liable to injury and shall be responsible for any loss of or damage to any equipment or materials by theft, breakage, or otherwise.
- C. All excavated materials and equipment to be incorporated in the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such location as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.
- D. 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.

### 3.05. PROJECT SIGNS

- A. The Contractor shall install and maintain construction signs for the duration of the Project. Signs to be installed and maintained by the Contractor include, but not limited to: project signs, "Construction Area" signs, and "No Trespassing/Keep Out" signs. Locations, wording, and size of signs shall be coordinated with Owner after the Contract is awarded. The Contractor shall fabricate and install signs, including up to 128 square feet of additional traffic and/or project signs. Prior to sign fabrication, the Contractor shall submit a draft template of the sign to the Engineer or approval of the layout and wording.

- B. The Contractor shall provide, and install where directed by the Engineer, one 4-foot by 8-foot project sign. The sign shall be plywood, MDO Exterior APA, supported on two 4-inch by 4-inch posts, with adequate bracing. Paint all surfaces with sign paint and provide lettering of size and type as required by the Owner and Engineer.
- C. The project signs shall be erected within ten (10) days after the construction contract is awarded. The project signs shall be fabricated, erected, and maintained by the Contractor.
- D. The Contractor shall provide adequate support for the signs as determined by the Engineer.
- E. The project signs shall be maintained by the Contractor in good condition at all times for the duration of construction. The Contractor shall remove the signs upon completion of construction.

3.06. OPEN EXCAVATIONS:

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe means for completely covering all open excavations and for accommodating travel when work is not in progress.
- B. 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.
- C. If the excavation becomes a hazard, then special construction procedures shall be taken, such as limiting the length of trench and prohibiting stocking excavated material in the street.
- D. All street excavations shall be completely closed at the end of each work day.
- E. Backfilling or use of steel plates of adequate strength to carry traffic shall be used.

3.07. MAINTENANCE OF TRAFFIC:

- A. All excavated materials and equipment shall be placed so that vehicular and pedestrian traffic may be maintained at all times.
- B. For the entire duration of the Project, the Contractor shall maintain open and safe access to the Site as shown on the Contract Drawings.
- C. The Contractor shall, at his own expense, provide and erect acceptable barricades, barrier fences, traffic signs, and all other traffic devices not specifically covered in a bid item, to protect the work from traffic, pedestrians, and animals.
- D. The Contractor shall furnish all construction signs that are deemed necessary by and in accordance with Part VI of the Manual on Uniform Traffic Control Devices as published by the U.S. Department of Transportation. In addition, the Contractor may be

required to furnish special construction warning signs. Locations, wording, and size of signs shall be coordinated with the Owner and Engineer after the Contract is awarded.

- E. Nothing contained herein shall be construed as relieving the Contractor of any of his responsibilities for protection of persons and property under the terms of the Contract.
- F. Conduct operations and removal of debris to ensure minimum interference with the normal use of public ways and other adjacent facilities. Do not close or obstruct traffic ways, streets, walks or other facilities without the written permission of the Owner and authorities having jurisdiction.
- G. The Contractor shall contact the Engineer before starting any work at the work site to review any traffic requirements.
- H. Provision shall be made for safe passage at all times for emergency vehicles onto the work site.

### 3.08. 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 promptly restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, to the satisfaction of the Engineer.
- B. The Contractor shall not enter upon nor occupy with workers, equipment or materials any property outside of the Limits of Work shown on the Contract Drawings, except with the written consent of the property owner or property owner's agent.

### 3.09. PROTECTION OF EXISTING UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all structures and utilities that are not scheduled for removal. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. The Contractor shall repair any damage resulting from his/her operations at his/her expense.
- B. The location of existing underground services and utilities shown on the Contract Drawings are based on available records. Although these documents may indicate the approximate location of existing utilities in the vicinity of the work, it is not warranted that all existing utilities and services are shown, or that indicated locations are correct. The Contractor shall coordinate all work involving utilities and shall verify the existing conditions of the areas in which the work is to be performed.
- C. The Contractor shall confirm the location of all underground utility services (including existing water services, drain lines, sewers, gas and fuel lines, electrical lines, and communications). The Contractor shall be responsible for having the utility companies locate their respective utilities at and in the vicinity of the site prior to excavating. To

satisfy the requirements of Massachusetts law, Chapter 82, Section 40, the Contractor shall, at least 72 hours, exclusive of Saturdays Sundays and holidays, prior to excavation in the proximity of telephone, gas, cable television, and electric utilities, notify the utilities concerned by calling "DIG SAFE" at 811 or 1-888-DIG-SAFE.

- D. All existing site utilities shall be terminated as shown on the Contract Drawings, and as required by the Engineer.
- E. The Contractor shall coordinate all work involving utilities and shall satisfy himself as to the existing conditions of the areas in which he is to perform his work. He shall conduct and arrange his work so as not to impede or interfere with the work of other contractors working in the same or adjacent areas.
- F. Where the dimensions and locations of existing structures and pipes are of importance for any part of the Work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment that is dependent on the correctness of such information
- G. Up to 50 cubic yards of test pits for the purpose of locating underground pipelines or structures shall be excavated and backfilled by the Contractor at the direction of the Engineer at no additional cost to the Owner. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.
- H. Fire hydrants shall at all times be left clear of obstructions and readily accessible to fire apparatus, and no material or other obstructions shall be placed within ten (10) feet of a fire hydrant. Refer to the Contract Drawings for locations of hydrants.
- I. All property damaged by the Contractor's operations, outside the Limits of Work shall be restored to a condition at least equal to that in which it was found immediately before work was begun. Suitable materials and methods shall be used for such restoration.

### 3.10. MAINTENANCE OF FLOW

- A. The Contractor shall surround catch basins around the perimeter of the Site that may receive runoff from the work area with compost filter socks and use silt bags as described in Section 01568 – EROSION AND SEDIMENT CONTROL and shown on the Contract Drawings, to protect drainage systems from sediment accumulation. If the Contractor damages or impairs any of the aforesaid drainage facilities, he shall repair the same within the same day.
- B. At the conclusion of the work, the Contractor shall remove all silt in drainage structures caused by his operations as described in Section 01740 – CLEANING UP.
- C. The Contractor shall maintain flow and keep in operation the fire hydrants for fire suppression purposes, in accordance with Protection and Relocation of Existing Structures and Utilities.

3.11. 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.
- B. Any errors, defects or omissions in the execution of the work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good by and at the expense of the Contractor and in a manner satisfactory to the Engineer.
- C. The Contractor shall reimburse the Owner for any expense, losses or damages incurred in consequence of any defect, error, omission or act of the Contractor or his employees, as determined by the Engineer, occurring previous to the final payment.

3.12. SANITARY REGULATIONS

- A. Sanitary conveniences for the use of all persons employed on the work, properly screened from public observation, shall be provided in sufficient numbers in such manner and at such locations as may be approved. The contents shall be removed and disposed of in a satisfactory manner as the occasion requires. The Contractor shall rigorously prohibit the committing of nuisances within, on or about the work. Any employees found violating these provisions shall be discharged and not again employed on the work without the written consent of the Engineer. The sanitary conveniences specified above shall be the obligation and responsibility of the Contractor.

3.13. SAFETY AND HEALTH REGULATIONS:

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Massachusetts Department of Labor and Industries, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction Operations (454 CMR 10.0 et. seq.)." Contractors shall be familiar with the requirements of these regulations.

3.14. SITE INVESTIGATION:

- A. The Contractor acknowledges that he has satisfied himself as to the conditions existing at the site of the work, the type of equipment required to perform this work, the quality and quantity of the materials furnished insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the drawings and specifications made a part of this contract. Any failure of the Contractor to acquaint himself with available information will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner.

3.15. ELECTRIC SERVICE:

- A. There is no temporary power available at the site. The Contractor shall make all necessary applications and arrangements and pay for all fees and charges for electrical

energy for power and light necessary for the proper completion of this contract during its entire progress. The Contractor shall provide generators and pay for all temporary wiring, switches, connections, and meters, as required.

- B. There shall be sufficient electric lighting so that all work may be done in a workmanlike manner where there is not sufficient daylight.

### 3.16 WATER SERVICE

- A. The Contractor shall provide necessary hoses to use the nearby hydrants located on site, including approvals/ requirements from the Arlington Department of Public Works (DPW) and Arlington Fire Department. The Contractor shall install temporary metered water lines with backflow preventers, as required, , and shall provide protection for the hydrant. Backflow preventers and meters are to be inspected and approved by the DPW prior to: (1) installation; and (2) use. Hydrants shall at all times be left clear of obstructions and readily accessible to fire apparatus, and no material or other obstructions shall be placed within ten (10) feet of a hydrant. Beyond the applicable Arlington Department of Public Works/Arlington Water Division permit/set-up fees, there will be no charge for the water usage; however, waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted use.

### 3.17. HAZARDOUS WASTE:

- A. Should the Contractor, while performing work under this contract, uncover suspected hazardous materials, as defined in Massachusetts Hazardous Waste Regulations 310 CMR 30.00, he shall immediately notify the Engineer.

### 3.18. CLEAN-UP AND DISPOSAL OF EXCESS MATERIAL

- A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. The Engineer and the Owner reserve the right to direct site cleanup if deemed necessary. Contractor shall dispose of all debris and residue resulting from the construction work and, at the conclusion of the work in each area, shall remove and haul away any surplus excavation, equipment, temporary structures, excess materials, and any other refuse and debris remaining from the construction operations in each area and shall leave the entire site of the work in a neat and orderly condition. The Contractor shall not remove excavated material or debris from the Site without the approval of the Engineer.
- B. The Contractor shall prevent carry-out or spillage of material from his/her vehicles onto public ways. The Contractor shall promptly clean up and dispose of all material and debris deposited on public ways to the Engineer and Owner's satisfaction. The Contractor also shall not create conditions that allow silt laden runoff to run onto public ways. Any silt and debris deposited onto public ways by runoff shall be cleaned up to the satisfaction of the Engineer and the Owner and means shall be employed to prevent recurrence of run-off deposits.
- C. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor shall, and his subcontractors

shall, comply with all applicable Federal, State, and local laws and regulations concerning waste material disposal, as well as the specific requirements stated elsewhere in these Specifications.

- D. The Contractor is advised that the disposal of excess excavated material in wetlands, stream corridors, and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. Therefore, the Contractor will be required to remove the material at his own expense and restore the area impacted.

END OF SECTION 01110

## SECTION 01300

### SUBMITTALS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. The Contractor shall provide the Engineer with submittals as required by the contract documents.

##### 1.02 RELATED WORK

- A. Divisions 1 – 16 of these specifications that require submittals.

#### PART 2 – PRODUCTS

Not Used

#### PART 3 – EXECUTION

##### 3.01 GENERAL

- A. As required by the General Conditions, Contractor shall submit a schedule of shop and working drawing submittals.
- B. The Contractor shall submit the shop and working drawing submittals either electronically or hard copy.

##### 3.02 ELECTRONIC SUBMITTALS:

- A. In accordance with the accepted schedule, the Contractor shall submit for review by the Owner's Representative, one electronic copy in Portable Document Format (PDF) of shop or working drawings required as noted in the specifications, of equipment, structural details, and materials fabricated especially for this Contract.
- B. Each electronic copy of the shop or working drawing shall be accompanied by a shop drawing transmittal form on which is a list of the drawings, descriptions and numbers and



the names of the Owner, Project, Contractor and building, equipment or structure.

- C. The Contractor shall receive a shop drawing memorandum with the Engineer's approval or comments via email.
- D. If electronic submittals are used, hard copy submittals are not required.

### 3.03 HARD COPY SUBMITTALS:

- A. In accordance with the accepted schedule, the Contractor shall submit by mail for review by the Owner's Representative, three (3) copies each of shop or working drawings required as noted in the specifications, of equipment, structural details and materials fabricated especially for this Contract.
- B. Each shipment of drawings shall be accompanied a shop drawing transmittal form on which is a list of the drawings, descriptions and numbers and the names of the Owner, Project, Contractor and building, equipment or structure.

### 3.04. OPERATIONS MANUALS

- A. Unless the specified operations manuals for equipment are submitted along with shop drawings at the time of submission no action will be taken on reviewing the shop drawings. The manuals shall include, at a minimum, operating instructions and recommended maintenance schedules for all the equipment to be furnished.

### 3.05. SHOP DRAWINGS, SAMPLES, PROJECT DATA

- A. The Contractor shall submit for review by the Owner's Representative shop drawings, setting schedules and such other drawings as may be necessary for the prosecution of the work in the shop and in the field as required by the Drawings, Specifications or the Owner's Representative's instructions. Deviations from the Drawings and Specifications shall be called to the attention of the Owner's Representative at the time of the first submission of shop drawings and other drawings for consideration. The Owner's Representative's review of any drawings shall not release the Contractor from responsibility for such deviations. Shop drawings shall be submitted with such promptness as to cause no delay in his work or the work of any other Contractor.
- B. When submitted for the Owner's Representatives' 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. Failure of the Contractor to provide certification is cause for the Owner's Representative to return shop drawings without review.

- C. All samples called for in the Specifications or required by the Owner's Representative shall be furnished by the Contractor and shall be submitted to the Owner's Representative for his review. Samples shall be furnished so as not to delay fabrication, and to allow the Owner's Representative 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" or "Make Corrections as Noted." 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 cover letter indicating that such samples are recommended by the Contractor for the service intended and that the Contractor's Guarantee will fully apply.
- H. All materials, equipment and workmanship shall be in accordance with samples guaranteed by the Contractor and reviewed by the Owner's Representative.

END OF SECTION 01300

## SECTION 01311

### CONSTRUCTION MEETINGS

#### PART 1 - GENERAL

##### 1.01. DESCRIPTION

- A. This Section specifies requirements for project meetings including but not limited to Pre-Construction Conference and Progress Meetings.
- B. It shall be the responsibility of the Contractor to coordinate work between all subcontractors, sections, and trades required for the proper completion of the Work.

##### 1.02. PRE-CONSTRUCTION CONFERENCE

- A. After the bids have been opened but prior to the start of the construction there will be a pre-construction conference to discuss the phasing and scheduling of the Project. The specific time and place of the conference shall be arranged by the Owner after the Contract has been awarded.
- B. This pre-construction conference is intended to establish lines of communication between the parties involved, review responsibilities and personnel assignments, establish project schedules, discuss proposed performance methods, and coordinate Work to be performed by subcontractors.
- C. Authorized representatives of the Owner, Engineer and their consultants, the Contractor, its Superintendent and Site Foreman, and all others invited by the Contractor, shall attend the pre-construction conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- D. Discuss items of significance at the pre-construction conference that could affect progress including at least the following:
  - 1. Tentative construction schedule.
  - 2. Critical Work sequencing.
  - 3. Designation of responsible personnel.
  - 4. Procedures for processing field decisions and Change Orders.
  - 5. Procedures for processing Applications for Payment.
  - 6. Review of Davis Bacon and other federal requirements.

7. Distribution of Contract Documents.
8. Submittal of Shop Drawings, Product Data and Samples.
9. Preparation of record documents.
10. Use of the premises.
11. Office, work and storage, and laydown areas.
12. Equipment deliveries.
13. Construction safety procedures.
14. Environmental health and safety procedures.
15. First aid.
16. Security.
17. Housekeeping.
18. Working hours.
19. Traffic Control.
20. Emergency Vehicle Access to and around work site.
21. Environmental protection measures for construction site.

### 1.03. PROGRESS MEETINGS

- A. During the course of the Project, the Contractor shall attend weekly progress meetings as scheduled by the Owner. The Owner, based on work progress and activities, may adjust the progress meetings to biweekly or other. The attendance of subcontractors may be required during the progress of the Work. The Contractor's delegate to the meeting shall be prepared and authorized to discuss the following items:
1. Progress of Work/Critical Work Sequencing in relation to Contract.
  2. Schedule.
  3. Proposed Work activities for forthcoming period.
  4. Resources committed to Contract.
  5. Coordination of Work with others.
  6. Status of procurement of equipment and materials.
  7. Status of Submittals.
  8. Outstanding actions, decisions, or approvals that affect Work activities.
  9. Site access and/or security issues.
  10. Hazards and risks.
  11. Housekeeping.
  12. Quality issues.
  13. Potential Claims.
  14. Change Orders.
  15. Costs, budget, and payment requests.
- B. The Contractor shall revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized and the revised schedule shall be submitted to the Engineer and Owner.

### PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION 01311

## SECTION 01450

### SAMPLING AND TESTING

#### PART 1- GENERAL

##### 1.01 SCOPE OF WORK

- A. The work under this Section shall consist of performing or ordering the work of collecting samples for testing, having tests performed by a Certified Testing Laboratory satisfactory to the Owner's Representative, having all test results forwarded to the Owner's Representative for approval, and paying all costs associated with the collection and sampling, transportation, shipping, postage, and testing, and the coordination of test results and approvals.

##### 1.02 SUBMITTALS

- A. In accordance with Section 01330 of these Specifications, submit the names, addresses and certification of laboratories to be utilized for approval by the Owner's Representative.

#### PART 2 - MATERIALS

##### 2.01 CONTAINERS AND TOOLS

- A. Utilize tools recommended by the laboratory to obtain samples, packaging or containers suitable to or furnished by, the laboratory, and collect all samples in the proper number and quantity to permit tests to be conducted.

##### 2.02 TESTS

- A. Refer to section specifications for test requirements and criteria for results; coordinate with the Owner's Representative.
- B. Cast in place concrete requires a slump and air entrainment test for every load of concrete delivered. All costs shall be the responsibility of the Contractor.
- C. The Contractor shall perform, at their full expense, disposal characterization sampling for all surplus soil at a frequency of 1 sample every 100 cubic yards of surplus soil. It is expected that the site has typical urban fill component that may include brick, concrete, tires, and the like. These materials are to be disposed of at no additional expense to the owner.

- D. Compaction tests are required on all base surfaces. Contractor shall provide testing at 5 locations at designer's direction or per Owner's direction. At the Contractor's expense, an independent testing agency must perform the work and submit the results directly to the Owner's Representative.
- E. Bioretention Basin and Porous Mix Asphalt Subgrade Infiltration Testing:
1. The Contractor shall provide up to three (3) test pits and subgrade soil infiltration tests where indicated by the Owner's Representative as required at no additional expense to the Owner.
  2. The infiltration rate of the subgrade at the bioretention basin and porous hot mix asphalt subgrade shall be confirmed through field testing prior to construction. One infiltration test shall be conducted at the bioretention basin and two at the porous hot mix asphalt path (one per area) unless otherwise instructed by Engineer. Confirmation that a limiting layer such as clay, bedrock, or seasonal high groundwater is at least two feet below infiltration subgrade shall be confirmed through test pit at the time of the infiltration testing prior to construction. The targeted infiltration rate is between 0.5 and ten inches per hour. Engineer shall be notified immediately if rate falls outside of targeted range. The field testing shall be conducted in accordance with ASTM D3385-09 Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer with the following modifications:
    - a. Manually controlling the flow of liquid is sufficient; however, the testing professional can consult the ASTM standard for additional methods. If manually controlling the liquid level, depth gages must be installed such that the reference head is between one and six inches. Place the depth gages towards the center of the inner ring and midway between the two rings
    - b. Test holes must be presoaked for one hour immediately prior to testing. The minimum water depth must be four inches. The drop in the water level during the last 30 minutes of the presoaking period must be applied to the following standard to determine the time interval between readings: If water level drop is two inches or more, use ten-minute measurement intervals. If water level drop is less than two inches, use 30-minute measurement intervals. The presoaking procedure is intended to simulate saturated conditions in the environment and to minimize the influence of unsaturated flow.
    - c. Testing must be conducted for a minimum of eight readings or until a stabilized infiltration rate is measured. A stabilized rate of drop means a difference of 0.25 inch or less of drop between the highest and lowest readings of four consecutive readings.
  3. Contractor shall coordinate the scheduling of the testing and allow adequate time for Engineer to review. Contractor shall conduct a conference at the Project site with the Engineer prior to commencement of soil infiltration testing.

4. A written memo with the infiltration rates shall be provided to the Engineer for review prior to the Contractor being given authorization to proceed with the bioretention basin installation.
- F. All other tests as indicated or required in the drawings and specifications.

## PART 3 - EXECUTION

### 3.01 METHODOLOGY

- A. Unless otherwise directed by the Section specifications, perform sampling and testing will be ordered by the Contractor and approved by the Owner's Representative. Locations, number and quantity of samples shall be submitted for approval as directed in accordance with the Specifications.
- B. Sampling and Testing results must be provided to the Owner's Representative and Approved prior to the installation of any work potentially impacted by unacceptable test results.

### 3.02 DISPOSAL CHARACTERIZATION SAMPLING

- A. The Contractor shall be responsible for sampling and characterizing excavated material for the purpose of obtaining approvals from the reuse or disposal/recycling facility(ies). The Contractor shall provide the Owner's Representative with a minimum of 2-days notice prior to sampling and shall not sample unless the Owner's Representative has approved the Contractor's reuse or disposal/recycling facility(ies) and the Owner's Representative is present to witness the collection of the samples.
- B. The Contractor shall perform disposal characterization sampling and analytical testing of the excavated material as required by the permitted disposal/recycling facility and at a minimum frequency of one (1) sample every 100 cubic yards of surplus soil. The Contractor shall collect additional samples to perform additional testing of the excavated material as required by the disposal/recycling facility(ies) at no additional cost to the Owner.
- C. All analyses shall be performed by a laboratory certified for such analyses by the Commonwealth of Massachusetts. The collected samples shall be submitted, at a minimum, for the following chemical analyses: total petroleum hydrocarbons (TPH) using modified EPA Method 8100, semi-volatile organic compounds (SVOCs) using EPA Method 8270, volatile organic compounds (VOCs) using EPA Method 8260, polychlorinated biphenyls using EPA Method 8082, RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) using Method 6010/7471, reactive cyanide and sulfide using EPA Method SW-846, Ignitability using modified EPA Method 1010, corrosivity using EPA Method 9045, and conductivity using EPA Method 120.1. Any samples found to contain contaminant concentrations equal to or



greater than “20 times” their hazardous waste toxicity threshold (i.e., the 20-times rule) shall be analyzed for toxicity characteristic leaching procedure (TCLP).

- D. Submit a copy of all chemical analyses and a tabulated summary of the data in MS Excel format to the Owner’s Representative within 2-days of receipt of the laboratory report.
- E. The Owner’s Representative may stop the Contractor’s work in a particular location at any time in order to have samples taken and analyzed. If necessary, the Contractor shall assist the Owner’s Representative in collecting samples. The work shall not resume in that area until directed by the Owner’s Representative. Stoppage of work for this reason, or until laboratory results are delivered to the Owner’s Representative, shall not be a cause for the Contractor to request additional compensation or an extension of time to the Contract or to other intermediate Contract deadlines.

END OF SECTION 01450

## SECTION 01562

### DUST CONTROL

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. This Section specifies requirements for controlling and monitoring air (odors/vapors) and dust generated during work of this Contract. Work activities requiring special attention to odor/vapor and dust control include demolition of subsurface structures, excavating, stockpiling, loading and removal of material from the Site, and earthwork.
- B. The Contractor is responsible for control of odors/vapors and dust at all times during work of this Contract, 24 hours per day, 7 days per week, including non-working hours, weekends, and holidays.
- C. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. The Engineer may perform air/dust monitoring for confirmation purposes. If dust emissions exceed action levels described in this Section, or determined to be a nuisance by the Engineer, the Contractor shall be responsible for implementing additional engineering controls (e.g. additional dust suppression agents, wind screens), as required by the Engineer, and described in this Section at no additional cost to the Owner.
- D. The Contractor is responsible for daily clean-up of public roadways affected by work of this Contract. A wet spray power vacuum street sweeper shall be used on pavement. Dry power sweeping is prohibited.

##### 1.02 RELATED WORK

- A. Section 00890 – PERMITS
- B. Section 01568 – EROSION AND SEDIMENT CONTROL
- C. Section 02300 – EARTHWORK

##### 1.03 REGULATORY REQUIREMENTS

- A. The Contractor shall perform all work specified under this Section in accordance with the Massachusetts Department of Environmental Protection, Code of Massachusetts Regulations (CMR) 310 CMR 7.00, “Air Pollution Control Regulations”, specifically 310 CMR 7.09, “Dust, Odor, Construction, and Demolition” and in compliance with any requirements imposed by Region 1 of the Environmental Protection Agency.
  
- B. Work of this Contract shall be conducted in a manner that will not result in excessive particulate matter emissions, nuisance dust conditions, PM10 (particulate matter with an aerodynamic diameter less than or equal to 10 microns) emissions or PM10 concentrations exceeding the Massachusetts and National Ambient Air Quality Standard of 150 µg/m<sup>3</sup> on 24-hour average basis.

#### 1.04 SUBMITTALS

- A. Contractor shall submit a Dust Control Plan that outlines, in detail, the means and measures that will be implemented to comply with this Section, including dust suppression (e.g. water), prevention, cleanup, and other measures. The Dust Control Plan shall be submitted to the Engineer within 14 days after issuance of the Notice to Proceed.
  
- B. Contractor shall submit to the Engineer product literature and Material Safety Data Sheets for any odor/vapor and dust suppression wetting agents and stabilizers prior to use.

#### 1.05 DUST MONITORING

- A. The Engineer may conduct air monitoring with a Mini RAM monitor, or equivalent, to ensure dust is being controlled at the site. During the course of the Work, the Contractor shall be responsible for implementing engineering controls (e.g., wetting) to minimize or eliminate fugitive dust emissions. If dust exceeds action levels described below, or determined to be a nuisance by the Engineer, the Contractor shall be responsible for implementing additional engineering controls (e.g. additional dust suppression agents, wind screens), as required by the Engineer. If additional wet suppression (water) and/or wind screens, barriers, or covers are required per the Engineer based on air/dust monitoring results, they shall be at no additional cost to the Owner.
  
- B. The Dust Control Plan shall use the following actions levels for implementation of dust suppression controls, increased personal protective equipment, and additional monitoring:

Dust Action Level: 150 micrograms per cubic meter (µg/m<sup>3</sup>)

## PART 2 - PRODUCTS

2.01 DUST SUPPRESSION AGENTS:

A. Water

1. Water shall not be brackish and shall be free from oil, acid, and injurious alkali or vegetable matter.

2.02 BARRIERS, SCREENS, AND COVERS

A. Mesh Fabric/Wind screens shall be a durable fabric mesh of 50 percent porosity,

attached to the temporary chain link fencing as shown on the Contract Drawings. Temporary chain link fencing to receive barriers, screens or covers shall be pile-driven along as necessary for proper support.

B. Wind barriers, if required, shall be solid wood fences or solid durable fabric, attached to Site's chain link fence, or other solid barriers intended to block the passage of wind.

C. Covers for stockpiles shall be 10-mil (minimum) nylon-reinforced polyethylene (NRPE) or 20-mil (minimum) polyethylene sheeting.

PART 3 - EXECUTION

3.01 CONSTRUCTION SITE DUST CONTROL – GENERAL:

A. Wet suppression shall be used to provide temporary control of dust. Several applications per day may be necessary to control dust depending upon meteorological conditions and work activity. The Contractor shall apply wet suppression on a routine basis as necessary or required by the Engineer, to control dust.

1. Wet suppression consists of the application of water or a wetting agent in solution with water. Ensure wetting agent is not used on plantable soils.

2. Wet suppression equipment shall consist of nozzle-equipped spray bar, sprinkler pipelines, pressure gauge, tanks, tank trucks, or other devices capable of providing regulated flow, uniform spray, and positive shut-off.

3. The Contractor shall provide the necessary means to retain, on-Site, all water runoff generated by dust control and dispose of such water in accordance with the requirements of the appropriate regulatory agencies. The Contractor shall be responsible for providing water, a means of disposal, necessary permits, and all appurtenances required to control dust.

B. The use of petroleum products for dust suppression is prohibited in this Contract.

C. Provide wind screens and wind barriers, if required, in locations where they would be effective in minimizing wind erosion and spread of dust. The Contractor shall keep wind screens and barriers in good repair for the life of the Contract.

3.02 PUBLIC ROADWAY DUST CONTROL:

A. Vehicles leaving the Site shall not carry out mud or dirt from the Site on the vehicle

body or wheels. Any foreign matter on the vehicle body or wheels shall be physically removed prior to vehicle's entering of a public roadway. Contractor shall not permit any truck to leave the Site with exterior mud or dirt that has the potential to be deposited on public roadways. Contractor shall be responsible for assuring that each vehicle is properly decontaminated prior to exiting the Site. The Contractor shall prevent carry-out or spillage of material from his/her vehicles onto public ways. The Contractor shall promptly clean up and dispose of all material and debris deposited on public ways to the Owner's satisfaction. If vehicles tracking mud and dirt off-Site, the Contractor shall be responsible for additional engineering controls such as wheel washing at no extra cost to the Owner. The Contractor shall be responsible for collecting all wash water and sediment, as required, at no additional cost to the Owner. The Contractor shall ensure that material hauling vehicles remain on paved surfaces as much as possible.

- B. Vehicle mud and dirt carryout, material spills, and soil wash-out onto public roadways and walkways and other paved areas shall be cleaned up immediately. The Contractor also shall not create conditions that allow silt laden runoff to run onto public ways. Any silt and debris deposited onto public ways by runoff shall be cleaned up to the satisfaction of the Owner and means shall be employed to prevent recurrence of run-off deposits at no additional expense to the Owner.
- C. Haul truck cargo areas shall be securely covered during material transport on public roadways.
- D. The Contractor is responsible for daily clean-up of public roadways and walkways affected by work of this Contract. A wet spray power vacuum street sweeper shall be used on paved roadway. Dry power sweeping is prohibited. Costs associated with cleaning/sweeping of public roadways is considered incidental to the Project.

### 3.03 CONTROL OF EARTHWORK DUST:

- A. During batch drop operations (i.e., earthwork with front-end loader, clamshell bucket, or backhoe) the free drop height of excavated or aggregate material shall be reduced as much as practical to minimize the generation of dust.
- B. To prevent spills during transport, freeboard space shall be maintained between the material load and the top of the truck cargo bed rail.

3.04 CONTROL OF STOCKPILE DUST:

- A. At a minimum the Contractor shall use the following methods to control dust and wind erosion of active and inactive stockpiles:
  - 1. Polyethylene tarps on stockpiles shall be placed both below and on top of stockpiles, and secured with sandbags or an equivalent method to prevent the cover from being dislodged by the wind. The Contractor shall repair or replace covers whenever damaged or dislodged, at no additional cost to the Owner.
  - 2. The tarps shall be bermed 12-inches high at all edges to prevent any infiltration of storm water or exfiltration of leachate.
- B. The methods to be used shall be submitted to the Engineer as part of the Dust Control Plan.

3.05 DEBRIS AND DEMOLITION HANDLING DUST CONTROL MEASURES:

- A. The Contractor shall use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in the air to the lowest practical level. Sufficient water shall be supplied for the building, demolition-related debris and Site compacting to meet Federal, State, and local air-quality regulations and to minimize dust during demolition and debris handling.
- B. During transport of debris, the truck cargo area shall be securely covered.

END OF SECTION 01562

## SECTION 01568

### EROSION AND SEDIMENT CONTROL

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. The work of this Section shall consist of providing all labor equipment, materials, incidental work, and construction methods necessary to provide and install erosion and sediment control, and related items as indicated on the Contract Documents and/or specified herein and includes but is not limited to the following:
1. Compost Filter Sock for perimeter protection, as shown in Contract documents.
  2. Straw Mulch for seed establishment and temporary soil stabilization.
  3. Erosion Control Matting along slopes of conveyance swale.
  4. Maintenance and removal of erosion control devices.
  5. Meeting all conditions for erosion control specified in the Conservation Commission's Order of Conditions as contained in Specification Section 01060, PERMITS AND REGULATORY REQUIREMENTS.
- B. This Section specifies equipment and materials for an erosion and sediment control program for minimizing erosion and siltation during the construction phase of the Project. The erosion and sediment control provisions detailed on the Contract Documents and specified herein are the minimum requirements for an erosion control program. The Contractor shall provide additional erosion and sediment control materials and methods as required to affect the erosion and siltation control principles specified herein.

##### 1.02 RELATED WORK

- A. The following items of related work are specified and included in other Sections of the Specifications:

1. Division 1, GENERAL REQUIREMENTS
2. Section 01060, PERMITS AND REGULATORY REQUIREMENTS
3. Section 02000, LANDSCAPE MANAGEMENT
4. Section 02100, SITE PREPARATION
5. Section 02300, EARTHMOVING
6. Section 02630, STORMWATER FACILITIES
7. Section 02900, PLANTING
8. Section 02930, SEEDING AND SODDING
9. Section 02950, PLANTING SOILS

### 1.03 REFERENCES

A. The following standards shall apply to the work of this Section.

1. MA DEP Erosion and Sediment Control Guidelines (1997, or most recent)
2. American Society for Testing and Materials (ASTM):
 

D 3786	Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method
D 4356	Practice for Establishing Consistent Test Method Tolerances
D 4491	Test Method for Water Permeability of Geotextiles by Permittivity
D 4533	Test Method for Trapezoidal Tearing Strength of Geotextiles
D 4632	Test Method for Grab Breaking Load and Elongation of Geotextiles
D 4751	Test Method for Determining the Apparent Opening Size of a Geotextile



D 4833 Test Method for Index Puncture of Geotextiles,  
Geomembranes, and Related Products

D 5035 Breaking Force and Elongation of Textile Fabrics (Strip  
Method)

3. Commonwealth of Massachusetts Highway Department (MHD):  
Standard Specifications for Highways and Bridges (1988, or most recent)

#### 1.04 SUBMITTALS

- A. Proposed methods, materials to be employed, and schedule for effecting erosion and siltation control and preventing erosion damage shall be submitted for approval. Submit the following in accordance with Section 01300 – SUBMITTALS:
  1. Schedule of erosion control program indicating specific dates for implementing programs in area of work.
  2. Straw Mulch: Submit product data, supplier location, year of cutting, and weed-free certification.
  3. Compost Filter Berm: Submit manufacturer's literature for filter berm fabric and organic fiber mulch.
  4. Erosion Control Matting: Submit manufacturer's literature and one material sample for matting.

#### 1.05 PERMITS, CODES, AND REGULATIONS

- A. Comply with all rules, regulations, laws and ordinances of the Town and State, and all other authorities having jurisdiction over the Project site. All labor, materials, equipment, and services necessary to make the work comply with such requirements shall be provided by the Contractor without additional cost to the Owner.
- B. Comply with the most stringent provisions of all applicable regulations of the Commonwealth of Massachusetts; Department of Environmental Protection (DEP); the Army Corps of Owner's Representatives (ACOE); and the United States Environmental Protection Agency (EPA).
- C. All erosion control work shall be in accordance with the Massachusetts Wetlands Protection Act 310 CMR-10.55 and the Order of Conditions as per the Arlington Conservation Commission. The Contractor shall be responsible for executing the Work contained in this permit as part of his bid. This includes all labor and materials.

#### 1.06 EROSION CONTROL PRINCIPLES

- A. The Contractor shall provide suitable and adequate means of sedimentation and erosion control during construction. Control measures shall prevent all wind and water caused erosion and siltation and sedimentation of stockpiled materials, wetlands, waterways,

construction areas, adjacent areas, and off-site areas. Erosion and sedimentation control work shall be accomplished adjacent to or in the following areas:

1. Soil stockpiles and on-site storage and staging areas.
  2. Cut and fill slopes and other stripped and graded areas.
  3. Adjacent to wetlands, waterways, or other protected areas as shown on the Contract Documents.
  4. Catch basins within the Project Area.
- B. Means of protection as noted on the Contract Documents indicate the minimum provisions necessary. Additional means of protection shall be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional expense to the Owner. The Contractor shall provide all materials and labor necessary to comply with the Order of Conditions issued by the Arlington Conservation Commission.
- C. Daily inspection and maintenance of all sediment control structures shall be provided to ensure intended purpose is accomplished. Sediment control measures shall be in working condition at the end of each day.
- D. After significant rainfall, sediment control structures shall be inspected for integrity. Any and all damaged devices shall be repaired immediately, and the Arlington Conservation Commission shall be notified immediately.
- E. The following erosion control principles shall apply to the land grading and construction phases:
1. Contractor shall perform stripping of vegetation, grading, or other soil disturbance in a manner that will minimize soil erosion. Erosion control devices shall be installed prior to start of all clearing and grubbing operations and excavation work.
  2. Contractor shall retain and protect natural vegetation to reduce the impact of wind and water caused erosion within the Project Area.
  3. Contractor shall limit the square footage of bare soil on the project that is exposed to wind and water caused erosion at any given time. Duration of bare soil exposure shall be limited to 5 calendar days.
  4. Contractor shall use straw mulch, or other approved stabilization measures to protect exposed areas during prolonged construction or other land disturbance (greater than or equal to 14 calendar days).
  5. Contractor shall install drainage provisions that will accommodate increased runoff that results from modifications of soil and surface conditions during and after disturbance. Such provisions shall be in addition to existing requirements and shall be installed at no additional cost to the Owner.
- F. Cut and fill slopes and stockpiled materials shall be protected to prevent wind and water caused erosion. Slopes shall be protected with temporary erosion protection

when erosion exposure period is expected to be greater than or equal to 1 calendar days.

1. Permanent erosion protection shall be accomplished by covering with an erosion protection material as specified on the Project Plans, as appropriate for prevailing conditions, and as approved by the Owner’s Representative.
2. On slopes with a gradient less than or equal to 3:1 temporary erosion protection shall be accomplished by covering the exposed soil with straw mulch as appropriate for prevailing conditions and as approved by the Owner’s Representative.

**PART 2 - PRODUCTS**

**2.01 EROSION AND SEDIMENTATION CONTROL MATERIALS - GENERAL**

- A. Provide straw mulch, compost filter sock, erosion control matting and other materials as required to prevent siltation and erosion. Contractor shall install, maintain and remove erosion control materials as required by the Owner’s Representative and the Arlington Conservation Commission throughout the Contract period.

**2.02 STRAW MULCH**

- A. Straw mulch shall consist of heat and mechanically treated shredded straw fibers. The straw mulch shall be clean, weed-free straw. The use of straw mulch that contains noxious weeds is not permitted.
  1. Use of straw. The use of clean straw with a low content of viable cereal grains and viable weed seed is an important component of successful erosion control.
  2. Physical condition. Straw mulch shall be bright in color and shall not be wet, musty, moldy caked, or dusty.
  3. Weed content. Straw shall be free of seeds rhizomes, or other viable parts of the following weeds:

Balloonvine	Canada Thistle	Johnsongrass & hybrids	Serrated Tussock
Bermudagrass	Curly Thistle	Musk Thistle	Sicklepod
Bindweed	Dodder	Phragmites	Spurred Anoda
Corn cockle	Giant Foxtail	Plumeless Thistle	Wild Garlic
Cocklebur	Horse Nettle	Quackgrass	Wild Onion

4. Straw mulch shall be All Purpose Straw, supplied by HydroStraw, LLC, or approved equal.

## 2.03 COMPOST FILTER SOCKS

- A. Compost filter socks shall be used for sediment control in select locations along the site perimeter as indicated in the Construction Documents.
- B. Compost filter socks shall be 12-inch diameter and consist of biodegradable mesh/fabric tubing filled with the appropriate compost blends, used for sediment and erosion control.
- C. Compost Filter Sock shall be one of the following or approved equal:
  - 1. Microbial Filter Mitt, as manufactured by Groundscapes Express, Inc.; 715 East St., Wrentham, MA 02093, Tel: 508-384-7140, Fax: 508- 384-0571, [www.groundscapeexpress.com](http://www.groundscapeexpress.com)
  - 2. BioSoxx, as manufactured by Filtrexx International, LLC, 35481 Grafton Eastern Rd., Grafton, OH 44044; Tel: 440-926-2607 Fax: 440- 926-4021, [www.filtrexx.com](http://www.filtrexx.com)
  - 3. BioSocks, as manufactured by Envirotech BioSolutions, P.O. BOX 25517, Honolulu, HI 96825 Tel: 800-913-2420, [www.newbiosolutions.com](http://www.newbiosolutions.com)

## 2.04 WOODEN STAKES

- A. Wooden stakes for use with compost filter socks shall be a full 2 inch x 2 inch width by 24 inch length.
- B. Wooden stakes shall be made of southern yellow pine, oak, or an approved equal material hard wood material.

## 2.05 EROSION CONTROL MATTING

- A. General: Erosion Control Matting shall consist of temporary mats and wooden stakes.
- B. Temporary Erosion Control Matting
  - 1. Temporary erosion control matting shall be used for long-term erosion control and vegetation establishment where natural vegetation will provide extended-term stabilization. Matting shall be 100% biodegradable double net straw-coconut blanket, comprised of 70% straw at 0.35 lbs/sq yd and 30% coconut fiber at 0.15 lbs/sq yd, encased in a woven, 100% biodegradable, natural organic fiber 9.3 lbs/1000 sq ft top and bottom net per ASTM D 3776. Thread to be biodegradable. Permissible shear stress for bare soil shall be 2.10 lbs/sf and maximum flow velocities shall be 8.0 fps. Erosion control matting shall be SC150BN, as manufactured by North American Green Systems, 14649 Highway 41 North, Evansville, IN, 47725, 800.772.2040 (tel), 812.867.6632 (fax), [www.nagreen.com](http://www.nagreen.com), or approved equal.
- C. Wooden Stakes:
  - 1. Wooden stakes shall be Southern Yellow Pine, one (1) inch by one (1) inch

average width by six (6) inch length, with a downward angled notch cut near the top to hold the matting in place.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Sequencing of the Erosion and Sediment Control execution shall be as provided on the Contract Drawings. Any proposed change to the sequence shall be approved in writing prior to execution by the Owner's Representative.

### 3.02 STRAW MULCH APPLICATION

- A. Straw mulch shall be applied only after stripping and stockpiling or reworking of existing soils has occurred.
- B. Material shall be evenly applied to a depth of approximately 1 inch, for 100% cover. Straw mulch shall be distributed by hand and not applied hydraulically.
- C. Mulch shall be applied on all surfaces where soil disturbance has occurred.
- D. Where seed and straw mulch have been placed, the area shall be prepared according to the Project Plans and Specifications Sections 02100 – SITE PREPARATION, 02120 – EARTH EXCAVATION, BACKFILL, FILL AND GRADING, and 02952 - SEEDING.

### 3.03 COMPOST FILTER SOCKS

- A. Compost filter sock perimeter control shall be constructed and installed as indicated on the Contract Documents and in accordance with the manufacturer's recommendations.
- B. Compost filter socks shall be inspected and maintained in accordance with the manufacturer's recommendations.

### 3.04 EROSION CONTROL MATTING

- A. Erosion control matting shall be installed immediately after permanent upland and wetland seeding in the areas designated on the Contract Documents, or as directed by Owner's Representative.
- B. Erosion control matting shall be installed in the following areas:
  - 1. Slopes greater than or equal to 3:1
- C. Matting shall be installed perpendicular to slopes and shall extend at least 3 feet beyond slope crest. Fibers shall be placed in contact with the straw mulch for the entire length of the mat. Provide check slot at top of slope and anchor slot at bottom of slope where indicated.

- D. Roll out the matting perpendicular to the slope. Do not stretch the fabric. In drainage swales, center the fabric along the flow line. Install the matting in a check slot at the top and bottom of the slope of the area to be covered. Check slots shall be 6 inches deep and 6 inches wide. Fabric shall extend down one wall of the check slot and across the full width of the base. Overlap edges of matting rolls 4 inches minimum and overlap the ends 18 inches at a minimum.
- E. Install stakes in check slots, edges, center and ends of rolls by driving specified wood stakes 2 feet on center over the entire area to be covered, except at check slots and ends of rolls, where stakes shall be placed 6 inches on center.
- F. Fill check slots with loam and tamp firmly.
- G. Following matting installation, roll the entire area with a smooth drum roller weighing between 50 and 75 pounds per linear foot of roller. The finished installation of matting shall be firmly in contact with the soil and provide a smooth, finished appearance free from lumps or depressions.

### 3.06 MAINTENANCE AND REMOVAL OF EROSION CONTROL DEVICES

- A. Erosion control devices shall include straw mulch, compost filter sock, and erosion control fabric installed in combination or installed separately.
- B. Wetland areas, water courses, and drainage swales adjacent to construction activities shall be monitored daily for evidence of silt intrusion and other adverse environmental impacts, which shall be corrected immediately upon discovery.
- C. Culverts and drainage ditches shall be kept clean and clear of obstructions during construction period.
- D. Erosion Control Devices
  - 1. Sediment behind the erosion control devices shall be checked daily and after each heavy rain.
  - 2. Condition of erosion control devices shall be checked daily or more frequently as required. Damaged and/or deteriorated items shall be replaced. Erosion control devices shall be maintained in place and in effective condition.
  - 3. Compost filter sock shall be inspected daily and maintained or replaced as required to maintain their effectiveness and essentially their original condition.
  - 4. Sediment deposits shall be disposed of off-site.
- E. Removal of Erosion Control Devices: Erosion control devices shall be maintained until all disturbed earth has been paved or vegetated, at which time they shall be removed.
  - 1. Erosion protection material shall be kept securely anchored and in place until acceptance of all stabilized slopes and planted areas.

2. Compost Filter Socks: Compost filter socks shall be removed from the site and disposed of legally.
3. Wood stakes used to secure compost filter socks shall be removed from the site and disposed of legally.
4. Any other erosion and sediment control devices used by the Contractor in addition to the specified contract items shall be removed at direction of the Owner's Representative.
5. After erosion control devices are removed, areas disturbed by these devices shall be re-graded and mulched as described in this specification section. All adjacent areas repaired to a condition equal with the adjacent lawns or plantings.

END OF SECTION 01568

SECTION 01701

PROJECT CLOSEOUT

## PART 1 - GENERAL

### 1.01. DESCRIPTION

- A. This section includes the requirements for project close out, including, but not limited to:
  1. Project As-Built Documents.
  2. Checkout and Certification.
  3. Final Clean Up.
  4. Substantial Completion.
  5. Closeout Timetable.
  6. Closeout Procedures.
  7. Owner's Manual Submittal.
  8. Final Submittals, Maintenance and Guarantee, and Bonds.
  9. Final Completion.
- B. Closeout checklist to be completed by the Engineer.

### 1.02. RELATED WORK

- A. General Requirements in their entirety.
- B. Section 01110 – CONTROL OF WORK AND MATERIALS
- C. Section 01568 – EROSION AND SEDIMENT CONTROL

## PART 2 – PRODUCTS

Not Used

## PART 3 – EXECUTION

### 3.01. AS-BUILT DOCUMENTS

- A. The Contractor shall maintain on site, separate from the documents used for construction, one set of the documents listed below, and as construction progresses, shall legibly record on these documents all changes made during construction.
  - 1. Contract Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other Modifications to the Contract.
  - 5. Reviewed shop drawings, product data, and samples.
  - 6. Written interpretations and clarifications.
  - 7. Field Orders.
  - 8. Field test reports properly verified.
- B. The completed As-Built Documents shall be submitted by the Contractor to the Engineer with the final Application for Payment. The As-Built documents shall include survey layout, grading and drainage information of the final conditions at the Site. As-Built drawings shall be submitted in digital file format on minimum 2GB flash drive. Electronic file type shall be PDF and AutoCAD files. Actual version of AutoCAD files shall be coordinated with the Owner's Representative.

### 3.02. CHECKOUT AND CERTIFICATIONS

- A. Prior to checkout and certifications, the following tasks shall be completed:
  - 1. Construction shall be complete. For this purpose, completion of construction is defined as follows:
    - a. The Contractor has completed site activities in conformance with the Contract Drawings and Specifications.
  - 2. All shop drawings shall have final approval.
  - 3. All sampling test results, if required, submitted to the Engineer.

### 3.03. FINAL CLEANING



- A. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
1. Clean the site, including landscape development areas of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to smooth, even textured surfaces.
  2. The Contractor shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, temporary utilities, construction equipment, fencing equipment, erosion and sediment control facilities, and temporary structures and facilities used during construction. 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.
  3. The Contractor shall cleanup and restore all areas affected by staging, trailer(s) placement and parking. Restoration includes regrading, re-establishing topsoil and reseedling.
  4. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

#### 3.04. SUBSTANTIAL COMPLETION

- A. Substantial Completion is officially defined in the General and Supplementary Conditions. The date of substantial completion will be certified by the Engineer. This date will not be certified until the following requirements have been satisfied by the Contractor:
1. All Contract requirements are complete. All individual units of equipment and treatment are fully operative and performing at specified efficiencies. Where efficiencies are not specified, performance shall meet acceptable standards for the particular unit.
  2. All field tests and inspections have been satisfactorily completed and reports forwarded to the Engineer.

#### 3.05. 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.

### 3.06. CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and is complete in accordance with Contract Documents and ready for Engineer's and the Owner's inspection.
- B. Accompany Engineer and Owner on inspection to verify conformance with the Contract Documents. Prepare a punch list of work items that have been determined by inspection to not conform to Contract Documents. Punch list items shall include work items that are missing, incomplete, damaged, incorrect items, or improperly installed or constructed. The Contractor shall correct the punch list deficiencies by re-work, modifications, or replacement, as appropriate, until the items conform to the Contract Documents. The initial punch list shall be produced by the Contractor, with copies to the Engineer and Owner's Project Manager. When the Contractor has reduced the number of deficient items to a reasonable level, the Engineer will develop a definitive punch list for the use of the Contractor.
- C. Provide submittals to Engineer that are required by governing or other authorities.
- D. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due. The Contractor shall submit the following documents with or prior to Final Application for Payment: Set of as-built documents, Contract Completion and Acceptance Certificate, Consent of Surety to Final Payment, Release and Waiver of Liens and Claims, Affidavit of Payment of Debts and Claims, and remaining releases, waivers, warranties/guarantees, and all other data required by the Contract Documents.

### 3.07. OPERATION AND MAINTENANCE

- A. The Contractor's attention is directed to the condition that one percent of the contract 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 have not been submitted.
- B. 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.

### 3.11. CLOSEOUT SUBMITTALS

- A. The closeout submittals include but are not necessarily limited to:
  - 1. Evidence of payment and release of liens.
  - 2. Waste shipment manifests, Bills of Lading (if required), weight slips, and shipping records.
  - 3. Records of quantities/weights of materials shipped off-site, including all contaminated materials to disposal facilities, construction debris to recycling/disposal facilities, and all recycled/reused materials.

4. All other records or documents as necessary (i.e. personal air sampling records, injury reports, etc.).
5. Construction photographs.
6. As-Built drawings, including survey/GPS information as described in Paragraph 3.01 of this Section and final grades.

### 3.12. FINAL COMPLETION

A. Prior to final completion, the following tasks shall be completed:

1. All items in the punch list shall be completed.
2. All Contract closeout documentation shall be submitted to and accepted by the Engineer.

### 3.13. COMPLETION CHECKLIST

A. When the project has been fully completed, Final Payment can be approved.

**PROJECT COMPLETION CHECKLIST**

Project \_\_\_\_\_

Job No. \_\_\_\_\_

As part of the project closeout, all items listed below must be checked off as being complete or otherwise accounted for. The person verifying completion of the item shall list the completion date and his/her initials.

<b>PROJECT CLOSEOUT CHECKLIST</b>		
	Date Completion	Verified by
<b>AS-BUILT DOCUMENTS HANDED OVER</b>		
1. Contract Drawings		
2. Specifications		
3. Addenda		
4. Change Orders/Contract Modifications		
5. Reviewed Shop Drawings, Product Data and Samples		
6. Written Interpretations/Clarifications		
7. Field Orders		
8. Field Test Reports		
<b>FINAL CLEANING</b>		
1. All Construction Facilities Removed		
2. All Construction Debris Removed		
3. All Areas Swept/Cleared		
<b>SUBSTANTIAL COMPLETION</b>		
1. All Items Complete		
<b>CLOSEOUT PROCEDURES</b>		

1. Written Certification Submitted that Work is Ready for OWNER & Engineer Inspector		
2. Inspection by OWNER, Engineer, Contractor completed		
3. Punch List of Nonconforming Items Prepared		
4. Documents Required by Governing or Other Authorities Submitted (List Them)		
5. Final Application for Payment Received		
6. Contact Completion and Acceptance Certificate Submittal		
7. Consent of Surety to Final Payment Submittal		
8. Release and Waiver of Liens and Claims Submitted		
9. Affidavit of Payment of Debts and Claims Submitted		
10. Warranties/Guarantees Submitted		
11. Other Required Releases and Waivers Submitted (List Them)		
12. Permits Submitted (List Them)		
13. Weekly Payrolls Submitted as Required by Law		
<b>FINAL COMPLETION</b>		
1. All Items in Punch List Completed		
2. All Other Required Documentation Submitted (List It)		
<b>CORRECTION/WARRANTY PERIOD</b>		
1. Correction Period Start Date:		
End Date:		
2. Specific Warranties Provided		
<u>Item</u>	<u>Warranty Duration</u>	

Full name of persons signing their initials on this checklist:		
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END OF SECTION 01701

## SECTION 02000

### LANDSCAPE MANAGEMENT

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

- A. The General Documents, as listed on the Table of Contents, and applicable parts of Division 1, GENERAL REQUIREMENTS shall be included and made a part of this Section.

##### 1.02 SUMMARY

- A. The work of this Section includes, but is not limited to, furnishing all labor, materials, equipment and incidentals required and complete all vegetation management work as indicated on the Drawings and as specified herein.
- B. The Contractor shall be responsible for (6) days of vegetation management work with a two-person crew.
- C. The work of this Section includes, but is not necessarily limited to the following:
  - 1. Cutting and pulling of primarily woody invasive saplings under one-inch (1") diameter.
  - 2. Cut-stem treatment of invasive shrubs and saplings one-inch (1") to two-inch (2") diameter.
  - 3. Cut-stem treatment of invasive vines and hand-pulling of herbaceous plants.
  - 4. Invasive species removal including cutting and pulling of primarily woody invasive species and herbicide application to Japanese knotweed.
  - 5. Mowing and selective brush cutting/clearing and/or herbicide application to herbaceous and woody vegetation in areas shown on Plans.

##### 1.03 RELATED WORK

- A. The following items of related work are specified and included in other Sections of the Specifications:
  - 1. Division 1, GENERAL REQUIREMENTS
  - 2. Section 01568, EROSION AND SEDIMENT CONTROL
  - 3. Section 02100, SITE PREPARATION
  - 4. Section 02210, EARTH EXCAVATION, BACKFILL, FILL, AND GRADING
  - 5. Section 02630, STORMWATER FACILITIES
  - 6. Section 02900, PLANTING
  - 7. Section 02950, SEEDING AND SODDING
  - 8. Appendix A, Town of Arlington Order of Conditions

##### 1.04 SUBMITTALS

- A. At least 30 days prior to the start of work described in this Section, LANDSCAPE MANAGEMENT, submit to the Owner's Representative proof of certification of

Foreman or Crew Leader as Massachusetts Certified Landscape Professional or Massachusetts Certified Horticulturist and proof of his/her current valid Massachusetts Herbicide Applicator's License not scheduled to expire during the anticipated life of the Project as described in this Section in accordance with QUALITY ASSURANCE paragraph of this Section.

- B. At least 30 days prior to proposed work start date as described in this Section, LANDSCAPE MANAGEMENT, submit to the Owner's Representative proof of certification of Foreman or Crew Leader as Massachusetts Certified Arborist and proof of his/her current valid Massachusetts Herbicide Applicator's License not scheduled to expire during the anticipated life of the Project as described in this Section.
- C. Submit proof of landscape/tree contractor's experience to the Owner's Representative in accordance with QUALITY ASSURANCE paragraph of this Section, LANDSCAPE MANAGEMENT.
- D. At least 30 days prior to commencing management work, submit to Owner's Representative a work plan that shall include a proposed work schedule described by management area and task.
- E. At least 30 days prior to ordering materials, the Contractor shall submit to the Owner's Representative samples, certifications, manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner's Representative reserves the right to reject, on or after delivery, any material which does not meet these Specifications.
- F. Material Sampling and Testing:
  - 1. Herbicide:
    - a. Submit manufacturer's product data certifying that the herbicide being supplied conforms to these Specifications.
    - b. Submit the purchasing receipt showing the total quantity purchased for the Project prior to commencement of management work.
    - c. Submit empty bottles or containers of herbicide to the Owner's Representative for verification of use.
  - 2. Herbicide Application Device(s): Submit manufacturer's product data of system or submit the actual device if home-made or no manufacturer's product data available.
  - 3. Dye: Submit manufacturer's product data.

## 1.05 REFERENCES

- A. Tree Maintenance, 7k" Edition, John R. Hartman, Thomas P. Pirone, and Mary Ann Sall,



1995, Oxford University Press.

- B. Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas, Mandy Tu, Callie Hurd, and John M. Randall, 2001, Wildland Invasive Species Program, The Nature Conservancy.
- C. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, Second Edition, Henry A. Gleason and Arthur Cronquist, 1991.
- D. American National Standards Institute (ANSI) Z133 and A300 standards.

#### 1.06 EXAMINATION OF CONDITIONS

- A. All areas to be managed, and particularly slope protection and path closure areas, shall be inspected by the Contractor before starting work and any defects such as incorrect grading, inadequate drainage or obstructions or impediments to the work of this Section, LANDSCAPE MANAGEMENT, shall be reported to the Owner's Representative at least ten days prior to commencement of work.

#### 1.07 QUALITY ASSURANCE

- A. Qualification of Landscape Contractor: The work of this Section, LANDSCAPE MANAGEMENT, shall be performed by a landscape contracting firm which has successfully completed vegetation management, invasive species control, and forestry work of a similar quality in environmentally sensitive areas, with similar schedule requirements, and of similar scale with a minimum of five years experience. Contractor shall have proven ability to correctly identify existing standing vegetation in the field at all times of year. Proof of this experience shall be submitted per SUBMITTALS paragraph of this section, LANDSCAPE MANAGEMENT.
- B. Qualification of Foreman or Crew Leader: All work of unloading, stockpiling, storing, transporting on site, logging, pruning, invasive species removal, herbiciding, maintenance of trees, shrubs, vines, groundcover, and herbaceous plants, and erosion control shall be supervised by a foreman or crew leader who is a certified landscape professional or a certified horticulturist. Foreman or Crew Leader shall have proven ability to correctly identify existing standing vegetation in the field at all times of year.
  - 1. The Field Manager assigned to this Contract must be consistent throughout the management period and shall have a Massachusetts Invasive Plant Management Certification.
  - 2. Landscape professional shall be a Massachusetts Certified Landscape Professional certified by the Associated Landscape Contractors of Massachusetts.
  - 3. Horticulturist shall be a Massachusetts Certified Horticulturist as certified by the Massachusetts Nursery and Landscape Association.
  - 4. Foreman or Crew Leader shall possess current and valid Massachusetts Herbicide Applicator's License as issued by the Massachusetts Department of Food and Agriculture. In conducting herbicide work, Foreman or Crew Leader shall follow procedures and take all safety precautions required by his/her Herbicide Applicator's License.

5. Certification shall be current. Proof of certification shall be submitted per SUBMITTALS paragraph of this Section, LANDSCAPE MANAGEMENT.
- C. The ratio of laborers to certified landscape professionals or certified horticulturist shall not exceed ten to one. Certified Landscape Professionals or Certified Horticulturist shall be on the project site throughout the day-to-day performance of the work, every day that work proceeds, as described in this Section, LANDSCAPE MANAGEMENT.
- D. Qualification of Arborist: All work of tree cutting, pruning and fertilizing shall be performed by an arborist certified by the Massachusetts Arborist Association or the International Society of Arboriculture.

## 1.08 DEFINITIONS

### A. MANAGEMENT AREAS

1. Refers to the area defined primarily by existing vegetation character, for which vegetation management maintenance, and miscellaneous management/maintenance tasks to be completed are described on the Drawings. This includes removal of invasive upland species within the Wellington Park project area. Any proposed variations from the work described by areas on the Drawings shall require approval from the Owner's Representative.

### B. VEGETATION MANAGEMENT TECHNIQUES (TERMS DEFINED)

1. Invasive Species Removal Requiring Herbicide Application:
  - a. Cut & Dab: Refers to cutting tree trunks and shrub, vine or herbaceous stems and application of herbicide with approved herbicide dabbing or painting applicator to the remaining stump. This method is often referred to and includes "cut-stump," "cut-stem," "frill," "paint" and "injection" forms of herbicide application. Cuts to tree trunks and shrub stems identified for cut & dab treatment shall be made at a height of two-three (2-3") inches above the ground surface.
2. Invasive Species Removal - Manual Techniques:
  - a. Hand Pull: Refers to manually pulling small stems, saplings or seedlings of invasive species such that above-ground portion and entire root system of plant is removed. This technique will apply only to plants less than or equal to one-quarter (1/4") inch caliper measured at a height of one (1') foot above the plant's root flare. Immediately following pulling of plant material, disturbed soil shall be tamped back in place.
  - b. Wrench: Refers to the use of a "weed wrench" or equivalent tool to pull stems or saplings of invasive species such that the entire plant is removed from the ground including its root system. This technique may be used as an alternative to the cut & dab method for stem sizes ranging from one quarter (1/4") inch to one (1") inch caliper measured at a height of one (1') foot above the plant's root flare. Immediately following pulling of plant material, disturbed soil shall

be firmly tamped back in place.

## PART 2 PRODUCTS

### 2.01 HERBICIDE & DYE

- A. Herbicide to be used for the control of invasive plants shall be a glyphosate-based product, such as Rodeo™ or approved equal, and devoid of any surfactant or spreading agents. Herbicide shall be applied at a minimum of 25% and maximum of 50% strength directly to cut stems or stumps of invasive plants immediately (e.g. within five minutes) following cutting.
- B. A dye that the herbicide manufacturer deems compatible with the herbicide product chosen for use shall be mixed for application with the herbicide. The herbicide manufacturer shall certify that the dye product chosen will in no way inhibit the intended effect nor dilute the strength of the herbicide product. The dye shall be a red color. The dye shall remain visible for a minimum of one (1) month following application.

### 2.02 HERBICIDE APPLICATION DEVICE

- A. Device shall be appropriate for cut-stem or cut-stump application, such as a “Weed Wand.” Application devices must be designed specifically to directly apply herbicide to cut stems or stumps with minimal overflow onto the ground. **STANDARD FOLIAR HERBICIDE SPOT SPRAYERS WILL BE UNACCEPTABLE FOR THIS PURPOSE.** References for direct stem herbicide application devices may be found in The Nature Conservancy’s Weed Control Methods Handbook referenced in the “REFERENCES” Section of this specification, LANDSCAPE MANAGEMENT.

## PART 3 EXECUTION

### 3.01 SAFETY

- A. All work conducted on this Project as described in this Section, LANDSCAPE MANAGEMENT Specifications shall follow and comply with OSHA standards at all times. In particular, tree climbing and tree felling techniques shall follow the highest standards of safety for workers and proximate park users alike. Herbicide applicators **MUST** wear all protective gear required by OSHA, Massachusetts Department of Food and Agriculture Herbicide Applicator’s License standards and recommended procedures and required on the label of the herbicide they are using (e.g. Rodeo™). Owner’s Representative shall reserve the power to temporarily or permanently stop all work should Contractor be found to be in noncompliance with safety standards.

### 3.02 SUMMARY

- A. Vegetation Management
  - 1. Objectives:
    - a. Remove and control invasive plant species (e.g. buckthorn species, oriental

bittersweet, Norway maple, garlic mustard, multiflora rose, Japanese knotweed)

- b. Manage and encourage the healthy growth and spread of desirable native plant species (e.g. arrowwood viburnum, gray dogwood, ferns, and white wood aster)

### 3.03 PROJECT AREA

- A. A program for invasive species management with a list of invasive species found within the work limits is presented in Table 1 in this Section. See Drawing SP, SITE PREPARATION PLAN for Invasive Removal Areas.

### 3.04 ACCESS AND STAGING

- A. Protective Measures and Equipment. Every attempt shall be made to use low ground pressure logging, mowing and brush-cutting equipment and to maximize distribution of heavy equipment weight over the ground throughout the site, but particularly within wetland areas. Every attempt shall be made to minimize damage to desirable vegetation to remain or be managed as shown on the Drawings. Any damage to desirable vegetation to remain caused by the Contractor's equipment shall be repaired or replaced in kind by the Contractor.
- B. Material Stockpiling. All cut materials unsuitable for on site re-use (e.g. invasive species such as buckthorn, oriental bittersweet or Norway maple) shall be removed immediately from source area and site as soon as possible and in no case shall remain on site for longer than two (2) working days following cutting. Excess material shall be stockpiled for removal from the site at a location or locations as directed by the Owner's Representative.
- C. Equipment Storage. All equipment necessary to complete the work described herein shall be stored during non-work periods at a location or locations as directed by the Owner's Representative. Exceptions shall only be granted for written requests from Contractor stating why the exception is necessary and requiring approval from the Owner's Representative.

### 3.05 PROJECT SCHEDULE AND TIMING

- A. Work in landscape management areas shall occur from May 1 through September 1 during the 3-year monitoring period.

### 3.06 VEGETATION MANAGEMENT

- A. General. All vegetation management work, and specifically pruning, shall be done in compliance with American National Standards Institute (ANSI) Z133 and A300 standards. Equipment, tools and/or techniques used to selectively thin or prune trees, remove or control invasive plant species or prune desirable shrub species shall be precise and sharp in their use or application such that minimal harm is done to adjacent or nearby desirable non-invasive vegetation to remain. The purpose of the work shall be to remove specified plants or vegetation stands while encouraging the overall health and growth of

surrounding native and/or non-invasive vegetation communities.

- B. Invasive Species Removal. In all areas, invasive species, which will be primarily woody plants, shall be either hand pulled, including weed wrenching, or cut to the ground and/or herbicided as specified and shown on Drawings. All cut invasive material including tree saplings (e.g. Norway maple, Tree-of-Heaven), shrubs (e.g. buckthorn, honeysuckle) and vines (e.g. oriental bittersweet, grapevine) shall be removed entirely from the site.

- 1. Herbicide Application

- a) Herbicide to be used for the control of invasive plants shall be a glyphosate-based product, such as Rodeo or approved equal, and devoid of any surfactant or spreading agents. Herbicide shall be applied at a minimum of 25% and maximum of 50% strength directly to cut stems of invasive plants, primarily woody plants. Herbicide shall contain a red dye that is compatible with and will not dilute the herbicide's strength. Dye shall be mixed with herbicide such that the dye is strong enough to be easily visible on stem or stump receiving the herbicide application. Herbicide shall not be applied as a foliar spray except in extremely limited locations as directed by the Owner's Representative. In conducting herbicide work, Foreman or Crew Leader and crew members shall follow all procedures and take all safety precautions required by Foreman's or Crew Leader's Herbicide Applicator's License.
- b) An herbicide wand, wiper, sponge-tipped or equal hand-held cut stem or cut stump applicator shall be used to apply herbicide directly to cut stems or stumps. Herbicide shall be dabbed, squirted, wiped, and/or painted directly on the entire exposed cambium (living inner tissue) of the stem or stump. Herbicide shall be applied to cut surface of the cut stem or stump IMMEDIATELY (e.g. within two minutes) after cutting. To this end, Contractor shall consider breaking crew into teams of two with one member cuffing the invasive plant and the other applying the herbicide immediately after cut plant is removed. Every attempt shall be made to use application methods and/or products which minimize overthrow or dripping of herbicide.

- D. Removal and Disposal of Cut Vegetation. All vegetation removal techniques must be approved by the Owner's Representative. Native trees and shrubs cut on site shall be re-used on site as live stakes or cut brush cover in existing woodland areas. All non-native vegetation cut from the project area, including non-native tree trunks, brush in the form of sapling trees, shrubs, and vines and herbaceous material shall be removed from the site and disposed of at legally approved disposal site(s) unless otherwise noted.

### 3.07 MAINTENANCE OF LANDSCAPE MANAGEMENT AREAS

- A. Maintenance for planted and/or seeded portions of the managed areas shall be as described in Section 02900, PLANTING, and Section 02952, SEEDING AND SODDING, of this specification.
- B. Contractor shall be held responsible for damage to or death of trees and shrubs intended to remain, including over-pruning of trees specified for pruning on the Drawings. Contractor shall replace in kind any damaged or removed trees and/or shrubs not intended for removal or pruning as described in this Section.

3.08 ACCEPTANCE STANDARDS

- A. Acceptance of invasive species removal work shall be based on one hundred (100%) percent removal of invasive species listed on the Drawings to the area extents shown on the Drawings.
- B. Acceptance of enhancement of vegetation to remain, including all pruning work, shall be based on one hundred (100%) percent completion of vegetation enhancement/pruning activities as directed by the Owner.

3.09 ACCEPTANCE

- A. At the completion of work, the Contractor shall request in writing that the Owner’s Representative conduct a formal inspection. Request for inspection shall be received by the Owner’s Representative at least 10 working days before the anticipated date of inspection. Following inspection, Contractor shall immediately conduct any remedial work that remains. At completion of any remedial work, the Contractor shall request in writing that the Owner’s Representative re-inspect the work.
- B. Following the minimum required maintenance period for construction, the Contractor shall request in writing that the Owner’s Representative conduct a formal final inspection. Request for inspection shall be received by the Owner’s Representative at least 10 working days before the anticipated date of inspection.
- C. Owner’s Representative’s inspection shall determine whether any maintenance shall continue or remedial actions be taken in any part.

TABLE 1

INVASIVE SPECIES MANAGEMENT PROGRAM (NONEXCLUSIVE)

	Scientific Name	Control Method
CANOPY TREES (Saplings only, under 2” dbh)		
Norway Maple	<i>Acer platanoides</i>	Cut-stem treatment
Tree-of-Heaven	<i>Ailanthus altissima</i>	Cut-stem treatment
UNDERSTORY/ ORNAMENTAL TREES (Saplings only, under 2” dbh)		
Autumn Olive	<i>Eleagnus umbellata</i>	Mechanical removal
Common Buckthorn	<i>Rhamnus cathartica</i>	Cut-stem treatment
Glossy Buckthorn	<i>Rhamnusfrangula</i>	Cut-stem treatment

## SHRUBS

Burning Bush	<i>Euonymus alatus</i>	Cut-stem treatment
Japanese Privet	<i>Ligustrum species</i>	Mechanical removal
Honeysuckle	<i>Lonicera species</i>	Mechanical removal
Multiflora Rose	<i>Rosa multiflora</i>	Cut-stem treatment

## VINES

Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Cut-stem treatment
Poison Ivy	<i>Toxicadendron radicans</i>	Cut-stem treatment
Grapevine	<i>Vitis species</i>	Cut-stem treatment

## HERBACEOUS PLANTS

Japanese Knotweed	<i>Polygonum cuspidatum</i>	Cut-stem treatment
Garlic Mustard	<i>Alliaria petiolate</i>	Hand pull
Common Reed	<i>Phragmites australis</i>	Cut-stem treatment

END OF SECTION 02000

## SECTION 02100

### SITE PREPARATION

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to prepare the site, complete, as indicated on the Contract Documents, as specified, and as follows:
1. Manner of conducting the work.
  2. Selective clearing and grubbing, thinning and pruning.
  3. Protection of existing trees and roots.
  4. Protection of existing structures and utilities.
  5. Temporary construction entrance and staging area preparation.
  6. Tree and root pruning and/or removal.
  7. Remove and disposal of materials.
  8. Removal and stockpiling of salvageable materials.
  9. Removal of all rubbish, debris, and other materials to be disposed of as a result of the work of this section.
  10. Strip and stockpile soil for re-use and excess disposal offsite.
  11. De-compacting soils.
  12. Restore staging area.

##### 1.02 RELATED WORK

- A. The following items of related work are specified and included in other Sections of the Specifications:



1. Section 01060, PERMITS AND REGULATORY REQUIREMENTS, Appendix A - ORDER OF CONDITIONS
2. Section 01568, EROSION AND SEDIMENTATION CONTROL
3. Section 02000, LANDSCAPE MANAGEMENT
4. Section 02120, EXCAVATION, BACKFILL, FILL, AND GRADING
5. Section 02500, FLEXIBLE POROUS PAVING
6. Section 02630, STORMWATER FACILITIES
7. Section 02740, BITUMINOUS CONCRETE PAVING
8. Section 02772, GRANITE CURB
9. Section 02800, SITE IMPROVEMENTS
10. Section 02900, PLANTING
11. Section 02950, PLANTING SOILS
12. Section 02952, SEEDING AND SODDING
13. Section 03300, CAST-IN-PLACE CONCRETE

### 1.03 REFERENCES

- A. The following standards shall apply to the work of this Section.
  1. Commonwealth of Massachusetts Highway Department (MHD): Specifications Standard Specifications for Highways and Bridges.
  2. American National Standards Institute (ANSI) standards.
    - A300 Tree Care Operations; Tree, Shrub, and Other Woody Plant Maintenance, Standard Practices
    - Part 1, Pruning
    - Part 2, Fertilization
    - Part 3, Support Systems a. Cabling, Bracing, and Guying
    - Z133.1 Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush
  3. National Arborist Association, 3537 Stratford Rd., Wantagh, NY 11793 (NAA):
    - Ref. 1 Pruning Standards for Shade Trees
    - Ref. 2 Standard for Fertilizing Shade and Ornamental Trees
  4. Massachusetts Food and Agriculture Department (MA):

Ref. 1 Control Recommendation Guide for Insect, Disease, and Weed Pests of Shade Trees and Woody Ornamentals

1.04 SUBMITTALS

- A. Submit permit for transport and legal disposal of debris.
- B. Submit location plan of staging areas and schedule for moving staging equipment into those areas. Plans and schedule shall be submitted for Owner's approval prior to mobilization and related site preparation operations.
- C. Submit to the Owner's Representative for review, proposed methods and materials for selective tree pruning, including a schedule indicating specific dates for implementing specific work items.
- D. Submit to the Owner's Representative name of professional Certified Arborist hired to perform the work of this Section, SITE PREPARATION, and proof of arborist's certification.
- E. Proposed methods, wrapping and fence materials and schedule for effecting tree and plant protection shall be submitted for approval.
- F. Proposed methods, materials, and schedule for tree pruning by Certified Arborist shall be submitted for approval.

1.05 PROTECTION

- A. Do not interfere with use of adjacent buildings or facilities. Maintain free and safe passage to and from adjacent buildings and facilities or both and between them and the public way.
- B. Cease operations and notify Owner immediately if safety of adjacent structures, workers, or the public appears to be endangered. Take precautions to properly support structures and protect workers and public. Do not resume operations until safety is restored.
- C. Prevent movement, settlement or collapse of adjacent services, sidewalks, driveways and trees. Assume liability for such movement, settlement, or collapse. Promptly repair damage at no cost to the Owner.
- D. Do not close or obstruct roadways without permits and approval by the Owner.

1.06 QUALITY ASSURANCE

- A. Tree pruning work shall be completed by a professional Certified Arborist with a minimum five years experience, who has successfully completed a certification program equal to the Massachusetts Certified Arborist (MCA) program/examination sponsored by the Massachusetts Arborists Association, Wellesley, MA 02181-7913; Tel: (617) 431-1625.
- B. Certification shall be current. Proof of certification shall be submitted per SUBMITTALS paragraph of this Section.

## 1.07 WARRANTY

### A. Damage and Destruction of Trees:

1. The Contractor shall be liable for all damage and/or disturbance to existing trees and shrubs not otherwise designated for removal throughout all portions of the Work of this Contract. Actual charges for damage to plants shall be in accordance with the schedules defined in this Section, SITE PREPARATION, with assessed charges to be deducted from sums payable under the Construction Contract.
  - a. Damage which, in the Owner's Representative's opinion, can be remedied by corrective maintenance shall be repaired immediately.
  - b. Trees and shrubs damaged irreparably shall, at the Owner's Representative's discretion, be replaced by the Contractor with new trees or shrubs of the same size and type.
  - c. In the event that replacement of damaged trees is impractical as determined by the Owner's Representative, the full replacement costs will be assessed to the Contractor's account.
2. Damaged trees or shrubs which require removal and/or replacement shall be removed as noted below:
  - a. Remove all trees, stumps, brush, vegetation, downed timber, rubbish, organic matter and other rubbish or extraneous debris.
  - b. Fell trees in such a way as to not injure other trees to be saved.

## PART 2 - PRODUCTS

### 2.01 TEMPORARY CONSTRUCTION ENTRANCE

- A. Temporary construction entrance shall be 2-3" coarse aggregate crushed stone
- B. Geotextile shall line the temporary construction entrance limits per Construction Documents
- C. Geotextile and stone shall be incidental to Site Preparation

### 2.02 TREE PROTECTION WRAPPING AND FENCING

- A. Protection of existing trees and plants from damage as a result of the Contractor's operations including, but not limited to:
  1. Tree protection wrapping and fencing - Tree Protection should be assumed for existing trees to remain within the project limit of work where proposed construction activity is to occur beneath the canopy and within the drip lines of existing trees to remain. Tree protection shall remain in place throughout the duration of the construction project but may be temporarily relocated to allow for work in select areas in close proximity to the trees to occur as approved

by the Owner's Representative. Tree protection shall be promptly restored following work operations. The measures described herein are anticipated to be required and will be verified based on actual field conditions.

2. Root Pruning - Provisions under this item include: tree protection fencing measures to minimize disturbance to existing trees and their root systems; canopy and root system review and evaluation; canopy and root pruning in areas of proposed disturbance; and post-pruning care including mulching and watering of root zones.

## 2.03 TREE WRAPPING

- A. Tree Protection Wrapping shall consist of 2 in. x 4 in. and 8 ft. height lumber wired together in close spacing with 16-gauge galvanized steel wire to form a protective enclosure around tree trunks.

## 2.04 TREE PROTECTION FENCE

- A. Tree Protection Fence, shall be equal to the following:
  1. 4' height, high-density polyethylene laminar netting. Mesh dimensions shall be 3- $\frac{3}{4}$ " X 2" with  $\frac{1}{2}$ " strands. Fabric color shall be black.
  2. Stakes for fencing shall be 6' long wood or metal drive stakes, commonly used to support fencing. Stakes shall be spaced 5' on center maximum. Attachment shall be by staples to wood or wiring to metal.

## 2.03 TEMPORARY CHAIN LINK CONSTRUCTION FENCE AND GATE

- A. Temporary chain link construction fence shall be 6' height.
- B. Chain link fence fabric shall be hot-dip aluminum coated ASTM A491, latest edition. Fabric shall be No. 9 gauge with a uniform, square mesh diagonal pattern measuring approximately 2 inches its parallel sides. The weight of aluminum coating shall be 0.40 ounce minimum per square foot of uncoated wire surface.
- C. Line and corner posts shall be standard full weight galvanized pipe. The pipe shall be new and shall be thoroughly galvanized on the inside and outside surface. All pipe shall be in accordance with ASTM A120, Schedule 40 pipe, and weigh 3.65 pounds per linear foot before galvanizing or shall be SS 40, Type II weighing 2.28 pounds per linear foot before.
- D. Fence fabric shall be fastened to posts by means of No. 6 gauge zinc coated wire clips. No post tops are required.
- E. Gates shall be fabricated using welded construction or heavy pressed steel or malleable corner fitting securely riveted. Gates shall be properly braced and diagonally trussed to eliminate any possible sagging. Hinges shall be of sufficient strength and design to

permit easy and trouble-free operation. All single swing gates shall be equipped with two H.O. hinges and one yoke latch per gate. All double swing gates shall be equipped with a positive type latching device with padlock fitting.

- F. Gate Posts: Posts for swing gates shall be 2.875 inches outside diameter standard weight galvanized steel pipe, weight 5.79 lbs. per linear foot.

### PART 3 – EXECUTION

#### 3.01 TIMING AND OWNER’S REQUIREMENTS

- A. Before beginning site preparation, including, but not limited to selective clearing and grubbing, tree pruning, tree removal, and/or demolition work, the Contractor shall meet jointly with the Owner and Owner’s Representative in order to discuss schedule and procedures to be utilized.
- B. The Contractor shall give the Owner adequate advance notice of his readiness to start Site Preparation work in order that the Owner can review the Contractor's plans for site closure and access to the construction site.

#### 3.02 MANNER OF CONDUCTING THE WORK

- A. The work shall be conducted with prime consideration given to the following:
  1. Compliance with governing laws and building codes.
  2. Safety, protection, and convenience of the public and workmen.
  3. Protection of the existing materials and finishes to remain from damage.
  4. Minimization of dirt and dust proliferation.
  5. Avoidance of any damage to existing vegetation to remain.
  7. Avoidance of excessive pruning of existing trees.
  8. Avoidance of filling or cutting over existing tree roots to remain.
  9. Complete control of erosion and prevention of spills or any contamination of the site.

#### 3.03 SAFETY

- A. All work conducted on this Project as described in this Section shall follow and comply with OSHA standards at all times. Owner’s Representative shall reserve the power to temporarily or permanently stop all work should Contractor be found to be in non-compliance with safety standards.

#### 3.04 TEMPORARY CONSTRUCTION ENTRANCE

- A. Temporary construction entrance shall be installed at each construction entrance per Construction Documents.
- B. Coarse aggregate stone depth shall be maintained during construction and periodically top dressed as needed.
- C. Trapped sediment shall be removed and disposed of off-site in a legal manner following storm events as needed to ensure proper function.
- D. Temporary construction entrance materials shall be removed and disposed of off-site at the conclusion of construction activities. Locations shall be restored per Construction Documents.

### 3.05 TEMPORARY CHAIN LINK CONSTRUCTION FENCE

- A. The construction fence shall be secured daily to ensure that there is no access to the site during non-work hours.
- B. Safety fences shall be checked regularly for any weather or other type of damage. Any damage shall be repaired by the Contractor within 24 hours once damage is discovered. All locking devices shall be repaired if broken and be in working order throughout the life of the fence. Any openings shall be secured.
- C. Construction fences shall be installed at the discretion of the Contractor so as to protect his ongoing work and to provide adequate public safety. The locations of the fence and gates shall be approved by the Owner's Representative to minimize interference with the work. Contractors shall move the fence as required during the work should its location interfere with construction operations.
- D. Fencing shall be removed at such time before final completion as the Owner's Representative directs. Restore site to acceptable condition after removing fence.

### 3.06 PROTECTION OF EXISTING TREES

- A. The Contractor shall install the existing tree protection fencing in the locations shown on the Contract Drawings and as directed by the Owner's Representative.
  - 1. The tree protection fence shall be installed prior to the start of any construction work, including any and all mobilization activities and delivery of material or equipment to the site. Remove fencing only after heavy site preparation construction has been completed as determined by the Owner's Representative in writing.
  - 2. Do not alter fencing unless directed to do so by the Owner's Representative in writing.
- B. If injury should occur to any tree during construction, it should be evaluated as soon as possible by the Owner's Representative so that appropriate treatments can be applied.
- C. Any grading, construction, demolition, or other work that is expected to encounter tree roots, must be monitored by a licensed arborist. Provide notice to licensed arborist three (3) days prior to activity.

- D. Before grading or excavation, trees shall be root pruned 1 foot outside the tree protection zone by cutting all roots cleanly to a depth of 24 inches. Roots shall be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, narrow trencher with sharp blades, or other root-pruning equipment approved by the licensed arborist.
- E. Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw.
- F. Soil from any excavation activities shall not be placed within the tree protection zone, either temporarily or permanently.
- G. Any accidental encroachment shall be reported to the Owner's Representative.
- H. Failure to protect existing vegetation to remain and the resource area from construction equipment and construction materials or both will be regarded as a severe violation of the requirements of the Contract Documents. In the event that the Contractor violates the requirements of tree protection and resource area in any manner as determined by the Owner's Representative, remedial activities shall be performed.

### 3.07 ROOT PRUNING

- A. Where construction will be in close proximity to existing trees designated to remain, roots shall be pruned prior to trenching and tunneling operations. Root pruning shall be performed as early as possible before trenching operations. Proximity shall be as determined in the field by the Owner's Representative.
- B. Root pruning is the physical cutting of tree roots to minimize root damage and promote healing. Root prune using a sharpened spade for all roots smaller than one-inch (25 mm) diameter. Root prune using an ax or chainsaw for all roots greater than one-inch (25 mm) diameter. Any method which tears roots or disturbs the soil beyond the grading limit is unacceptable. Do not use backhoe bucket or any other excavating machine to root prune.
- C. Backfill root pruning trench with existing soil mixed with peat moss to a mixture of approximately 75 percent loam and 25 percent humus by volume. Tamp soil in 6-inch (150 mm) lifts. Each lift shall be compacted to a point at which a foot print makes only a 1/16 inch (1.5 mm) impression.
- D. Apply mulch to a depth of 4 inches (100 mm) at minimum 10 ft. (3.0 m) to 15 ft. (4.5 m) radius around tree to reduce compaction and increase moisture retention.

### 3.08 TREE REMOVAL

- A. Trees designated for removal on the plans shall be removed from the site. This work shall include the felling of the trees in such a way as to not injure trees to be saved, utility lines and poles, lawns, plantings and pavement. Tree removal also shall include the satisfactory disposal of all tree trunks, branches, stumps and vegetative debris produced through the tree removal operation.

- B. Prior to the commencement of tree removal operations the Contractor shall review with the Owner's Representative which trees shall be removed. Under no circumstances shall the tree removal operation commence without the written concurrence of the Owner's Representative.

### 3.09 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. Existing structures and utilities shall be suitably protected from damage, including but not limited to existing pavements and curbs, site walls, lighting, fencing, concrete vault, manholes, and utility lines.
- B. Provide and install erosion and sedimentation control at all existing catch basins, manholes and all other utility structures as specified under Section 01568, EROSION AND SEDIMENT CONTROL.

### 3.10 CLEARING AND GRUBBING:

- A. Clearing:
  - 1. Unless otherwise indicated, the Contractor shall cut or otherwise remove all trees, suckering trees, saplings, brush and vines, windfalls, logs and trees lying on the ground, dead trees and stubs more than 1-foot high above the ground surface (but not their stumps), trees which have been partially uprooted by natural or other causes (including their stumps), and other vegetable matter such as shags, sawdust, bark, refuse, and similar materials.
  - 2. The Contractor shall not remove mature trees (5-inches or greater DBH) within clear and grub areas unless otherwise noted on the Construction Documents.
  - 3. Except where clearing is done by uprooting with machinery or where stumps are left longer to facilitate subsequent grubbing operations, trees, stumps, and stubs to be cleared shall be cut as close to the ground as practicable but not more than 6-inches above the ground surface in the case of small trees, and 12-inches in the case of large trees. Saplings, brush and vines shall be cut close to the ground.
- B. Grubbing:
  - 1. Unless otherwise indicated, the Contractor shall completely remove all stumps and roots to a depth of 18-inches, or if the Contractor elects to grind the stumps, they shall be ground to a minimum depth of 6-inches.
  - 2. Any depression remaining from the removal of a stump and not adequately filled in by backfilling shall be filled with planting soil, whichever is appropriate to achieve a smooth, level grade at the proposed ground surface.
- C. Disposal:



1. All material collected in the course of the clearing and grubbing, which is not to remain, shall be disposed of in a satisfactory manner away from the site or as otherwise approved at no additional cost to the owner. Such disposal shall be carried on as promptly as possible and shall not be left until the final clean-up period.

### 3.11 STRIP AND STOCKPILE SOIL

- A. Prior to starting general excavation, all topsoil shall be stripped to a depth of six (6) inches and stockpiled in approved locations for later reuse. The subsoil shall be removed as necessary and placed in a separate pile.
- B. Care shall be taken not to mix the two layers during excavation and stockpiling. Excessive incorporation of Subsoil into the existing topsoil will compromise the material and require replacement at the Contractor's expense.
- C. Soil that is to be stockpiled longer than two weeks, whether on or off site, shall not be placed in mounds greater than six feet high. If soil stockpiles greater than six feet high are to be stored for more than one month, the contractor shall break down and disperse soil so that mounds do not exceed the six-foot height restriction or thoroughly turn over the stockpile once a month.
- D. Soil materials shall not be handled or hauled, placed or compacted when it is wet, as after precipitation, nor when frozen. Soil shall be handled only when the moisture content is less than optimum moisture content as determined by Standard Proctor.
- E. Silt fencing shall be installed around the stockpiles to eliminate any sediment runoff from leaving the site. Appropriate berms shall be constructed as directed by the Landscape Architect to divert and control storm water from flowing to stockpiles.
- F. Composite samples shall be collected from the Stripped and Stockpiled Topsoil and be submitted for horticultural analyses per the requirements of Section 02950, PLANTING SOIL.
- G. Stripped and Stockpiled Topsoil must be screened to 3/4"-minus or finer prior to reuse.
- H. All stockpiled soil shall be covered and protected from wind and water erosion as specified in the Section 01568, EROSION AND SEDIMENT CONTROL and provided, installed and for under the work of this Section.
- I. If topsoil can't meet the specifications for Planting as specified under the aforementioned Sections, it may be used as ordinary fill if it meets the requirements as specified. All topsoil that is found under paved areas shall be stripped and either used as fill, if it meets the requirements for fill, or removed from the site and disposed of in a legal manner.
- J. Contractor shall not remove existing soil from the contract limits of work without the written approval of the Owner's Representative.
- K. Disposal:

1. All excess stripped material shall be removed from the site and disposed of in a legal manner at no cost to the owner. Such disposal shall be carried out as promptly as possible.

### 3.12 REMOVAL AND STOCKPILING AND SALVAGING OF MATERIALS

- A. Materials designated for removal and stockpile shall be removed in good condition and protected for re-use on the project or returned to the Owner. Salvaging and stockpiling include, but are not limited to, the following:
  1. Granite boulders.

### 3.13 BITUMINOUS CONCRETE PAVING REMOVAL AND DISPOSAL

- A. Where indicated on the Drawings, and as directed by the Owner's Representative, existing bituminous concrete pavement shall be removed and legally disposed of off-site.
  1. Where pavement to be removed abuts pavement and curb to remain, a neat, straight cut shall be made.
  2. Base material should be excavated to the required depths per the contract drawings, removed and disposed of off-site in a legal manner.

### 3.14 REMOVAL AND DISPOSAL OF MATERIAL

- A. Material resulting from the site preparation work and not scheduled to be salvaged and which is unsuitable for reuse on the project, shall become the property of the Contractor and shall be legally disposed of off-site.
- B. Debris, rubbish, and other material shall be disposed of promptly and shall not be left until final cleanup of site.
- C. Existing site structures indicated on the Contract Documents to be removed, shall be completely dismantled and removed from the site.
- D. Areas formerly occupied by structures shall be regraded to conform with surrounding topography following demolition.

END OF SECTION 02100

## SECTION 02120

### EARTH EXCAVATION, BACKFILL, FILL AND GRADING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Provide all labor, equipment, materials, incidental work, and construction methods necessary to complete the earthwork which includes, but is not necessarily limited to the following:
1. Trench backfill.
  2. Fill materials, fill and compaction.
  3. Rough grading.
  4. Removal of surplus or unsuitable materials.
  5. Dust control.
  6. Preparation of subgrade for curbs, pavements, and seeding.
  7. #57 Crushed Stone Double Washed Stone (Porous Hot Mix Asphalt Path and Bioretention Basin).
  8. #2 Open Graded Double Washed Stone (Porous Asphalt Path).
  9. 3/8" Pea Gravel Double Washed (Bioretention Basin).
  10. Non-woven Geotextile Fabric.

##### 1.02 RELATED WORK UNDER OTHER SECTIONS

A. The following items of related work are specified and included in other Sections of the Specifications:

1. Section 01060, PERMITS AND REGULATIONS - Appendix A, ORDER OF CONDITIONS
2. Section 01562, DUST CONTROL
3. Section 01568, EROSION AND SEDIMENT CONTROL
4. Section 02100, SITE PREPARATION
5. Section 02772, GRANITE CURB
6. Section 02795, POROUS HOT MIX ASPHALT
7. Section 02800, SITE IMPROVEMENTS
8. Section 02900, PLANTING
9. Section 02950, PLANTING SOIL
10. Section 02952, SEEDING AND SODDING
11. Section 03300, CAST-IN-PLACE CONCRETE

### 1.03 REFERENCES

A. The following standards shall apply to the work of this Section.

1. Associated General Contractors of America, Inc. (AGC): Manual of Accident Prevention in Construction

2. American Society for Testing and Materials (ASTM):

D 422 Particle - Size Analysis of Soils

D 1556 Density of Soil In-Place by the Sand Cone Method

D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Method Effort

D 2167 Density and Unit Weight of Soil In-Place by the Rubber Balloon Method

D 2487 Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D 2922 Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)

D 2937 Density of Soil In-Place by the Drive-Cylinder Method

D 3017 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D 3786 Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method

- D 4318          Liquid Limit, Plastic Limit, and Plasticity Index of Soils
  
- D 4356          Practice for Establishing Consistent Test Method Tolerances
  
- D 4491          Test Method for Water Permeability of Geotextiles by Permittivity
  
- D 4533          Test Method for Trapezoidal Tearing Strength of Geotextiles
  
- D 4632          Test Method for Grab Breaking Load and Elongation of Geotextiles
  
- D 4751          Test Method for Determining the Apparent Opening Size of a Geotextile
  
- D 4833          Test Method for Index Puncture of Geotextiles, Geomembranes, and Related Products
  
- D 5035          Breaking Force and Elongation of Textile Fabrics (Strip Method

3. Massachusetts Department of Transportation (MassDOT):

Standard Specifications for Highways and Bridges (herein referred to as the MassDOT Standard Specifications).

4. American Association of State Highway and Transportation Officials (AASHTO):

- T11      Material Finer than 75 um (No. 200) Sieve in Mineral Aggregates by Washing
- T27      Sieve Analysis of Fine and Course Aggregates
  
- T 194    Standard Method of Test for Determination of Organic Matter in Soils by Wet Combustion

5. OSHA Subpart P Section 1926, Safety and Health Regulations for Construction

1.04 DEFINITIONS

- A. Backfill: Soil material used to fill an excavation.
  
- B. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

- C. Embankment: Any area on the site where the Contractor is required to raise grades to proposed subgrade elevations. Embankments are placed in layers to a predetermined elevation and cross section.
- D. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
- E. Fill: Soil materials used to raise existing grades.
- F. Finished Grade: Final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slope between points for which finished grades are indicated or between such points and existing established grades. No ponding of surfaces shall be allowed due to lack of improper pitches across surfaces that will not allow proper drainage to occur.
- G. Rough Grade: The top surface of subbase or base courses such as gravel, crushed stone, ordinary fill, and the like, ready to receive the final surface material application. Unless stated otherwise, all rough grades shall represent compacted material depths, as specified herein.
- H. Soil: All earth materials, organic or inorganic, which have resulted from natural processes such as weathering, decay, and chemical action of in situ rock or the deposition of unconsolidated material in which more than 35 percent by weight will pass a No. 200 sieve.
- I. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- J. Unauthorized Excavation: Removing materials beyond indicated subgrade elevations or dimensions without direction by the Owner's Representative. Unauthorized excavation, as well as remedial work directed by the Owner's Representative, shall be at the Contractor's expense.
- K. Unsuitable Material: Material which is classified as "unsuitable" shall be material having at least one of the following properties:
  - 1. Material with a maximum unit dry weight per cubic foot less than 90 lb. (40.9 kg) as determined by ASTM D 1557.
  - 2. Material containing visible organic matter, topsoil, organic silt, peat, construction debris, frozen material, roots, and stumps.
  - 3. Material which has a Liquid Limit greater than 55 when tested in accordance with ASTM D 4318.
- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

## 1.05 SUBMITTALS

- A. 10 lb. sample of each off-site material proposed for use, and of any on-site material when so requested by the Architect or Testing Laboratory, shall be submitted for approval.
  - 1. Samples shall be delivered to the Architect or Testing Laboratory, as directed.
  - 2. Samples required in connection with compaction tests will be taken and transported by the Testing Laboratory.
- B. Product Data for the following:
  - 1. 3/4" Crushed Stone: Provide gradation and source.
  - 2. 3/8" Pea Gravel (clean and double washed): Provide gradation and source.
  - 3. #57 Crushed Stone (clean and double washed): Provide gradation and source.
  - 4. #2 Open Graded Reservoir Stone: Provide gradation and source.
  - 5. Gravel: Provide gradation and source.
  - 6. Non-Woven Geotextile Fabric
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated.
- D. Classification according to ASTM D 2487 of each common fill material proposed for fill and backfill.
- E. Laboratory compaction curve according to ASTM D 1557 for each common fill material proposed for fill and backfill.

## 1.06 QUALITY ASSURANCE

- A. Unless otherwise specified, work and materials for earthwork shall conform to the following:
  - 1. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

## 1.07 QUALITY CONTROL TESTING REQUIREMENTS

- A. Contractor shall select and the Owner shall approve a qualified independent geotechnical engineering testing agency to perform on-site observation and testing during all phases of the construction operations. Independent geotechnical engineering testing agency shall be paid directly by the Contractor and reimbursed by the Owner upon submission of receipts for testing and observation services. Owner will not reimburse Contractor for testing services or field observation when test results indicate that materials or

compaction requirements do not meet the requirements of this Section, EARTH EXCAVATION, BACKFILL, FILL AND GRADING. The geotechnical consultant shall:

1. Classify proposed common fill soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.
  2. Observation during placement and compaction of fills.
  3. Laboratory testing and analysis of fill materials specified, as required by the Owner's Representative.
  4. Observation of fills following interruptions by rains or other inclement weather.
- B. When subgrade, fills or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.
- C. Testing of soils shall be in accordance with the following:
- | <u>Property</u>          | <u>ASTM Test Method</u> |
|--------------------------|-------------------------|
| Particle - Size Analysis | D 422                   |
| Liquid Limit             | D 4318                  |
| Plasticity Index         | D 4318                  |
- D. The testing laboratory's presence does not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the testing laboratory, nor any observations and testing performed by the testing laboratory shall excuse the Contractor from defects discovered in his work.
- E. The Owner reserves the right to modify or waive testing laboratory services.

#### 1.08 EXAMINATION OF EXISTING CONDITIONS

- A. The Contractor shall become thoroughly familiar with the existing conditions of the site, consult records and drawings of adjacent structures and of existing utilities and their connections, and note all conditions which may influence the work of this Section, EARTHWORK EXCAVATION, BACKFILL, FILL AND GRADING.
- B. By submitting a bid, the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section, EARTH EXCAVATION, BACKFILL, FILL AND GRADING. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.



- C. The Contractor may, at his own expense, conduct additional subsurface testing as required for his own information.

1.09 INFORMATION NOT GUARANTEED

- A. Information in the Contract Documents relating to subsurface conditions, natural phenomena, and existing utilities and structures is from the best sources presently available. Such information is furnished only for the information and convenience of the Contractor, and the accuracy or completeness of this information is not guaranteed.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period, as no additional compensation will be made for errors and inaccuracies that may be found therein.

1.10 PROJECT CONDITIONS

- A. Any material not suitable for reuse in accordance with these Specifications shall be removed and disposed of at no additional cost to the Town of Arlington.

1.11 COORDINATION

- A. As construction proceeds, the Contractor shall be responsible for notifying the Owner's Representative prior to start of earthwork operations requiring inspection and/or testing.
- B. In the event that the Contractor does not notify the Owner's Representative prior to the start of earthwork operations and inspections and tests are not made or performed by the Owner's testing agents, the Owner's Representative may require the Contractor to remove all earthwork performed without the necessary inspections and replaced under the required supervision, review, inspections or tests at no additional cost to the Owner.
- C. The Contractor shall be responsible for obtaining test samples of soil materials proposed to be used and transporting them to the site sufficiently in advance of time planned for use of these materials for testing of materials to be completed. Use of these proposed materials by the Contractor prior to testing and approval or rejection shall be at the Contractor's risk.

## 1.12 RECORD DRAWINGS

- A. The Contractor shall submit to the Owner a set of as-built drawings for work covered under these Specifications. The drawings shall be prepared upon reproducible copies of the Contract Documents supplied by the Owner. As-built drawings shall record all changes made during construction with respect to materials, layout, grading contours and spot elevations, all as compared to the original Contract Drawings.

## PART 2 - PRODUCTS

### 2.01 SOURCE OF MATERIALS

- A. Material shall be obtained from required on-site excavation, to the extent that suitable material is available, and from off-site sources, to the extent that suitable material is not available from on-site excavation.

### 2.02 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations. Gradation requirements shall be determined by AASHTO T11 and T27.
  - 1. Borrow material shall from on-site or off-site sources shall contain salt levels less than 1.0 milliohms/cm as measured by electrical conductivity (EC2) of a 1:2 soil-water suspension (Test minus sieve #4 material.). Borrow material with levels of salt in excess of this level will be considered unsuitable material and shall be removed from the site by the Contractor at no additional cost to the Owner.
  - 2. Borrow material from on-site and off-site sources shall contain levels of heavy metals or PCB less than the following levels:

Toxic Elements Maximum Concentration (mg/kg dry weight)

Arsenic	30
Boron	300
Cadmium	14
Chromium	1000
Copper	1000
Lead	300
Mercury	10
Molybdenum	10

Nickel	200
Selenium	36
Zinc	2500
PCBs	1

Borrow material with levels of heavy metals and PCBs in excess of these levels will be considered unsuitable material and shall be removed by the Contractor from the site and disposed of legally at no additional cost to the Owner.

3. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, SW, and SP; free of rock or gravel larger than 2 in. in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.
4. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, GM, SC, SM, ML, MH, CL, CH, OL, OH, and PT.

B. Backfill and Fill Materials: Satisfactory soil materials as described above. On-site material for use in compacted backfill shall be natural, inorganic, granular soil, taken from areas of excavation after stripping of topsoil and removal of unsatisfactory soil materials as described above.

1. Use only backfill materials meeting the requirements of satisfactory soil materials that are free from rocks greater than 4in. in diameter or length, that have largest dimension no greater than  $\frac{3}{4}$  lift thickness, or are no greater than  $\frac{1}{2}$  ft.<sup>3</sup> in volume. Do not use any foreign matter, such as construction debris, trash, wood, roots, leaves, sod, organic matter, or soft clay and silt. Sound pieces of building stone, masonry, and concrete from on-site sources subject to the same size limitations as stone, may be employed in backfill. Individual pieces shall be mixed into general backfill material, leaving no voids between pieces. Backfill shall be clean, non-organic material, of non-swelling character, capable of being readily compacted to form a solid, stable embankment. Materials containing ice or frozen lumps shall not be employed.
2. Backfill and fill materials for use under lawns and planted areas shall be free draining materials that drain at a rate greater than or equal to one inch per hour after compaction to the specified levels.

C. Common fill shall conform to ASTM D2487 soil classification groups GW, GP, SW, and SP, and be well graded, natural inorganic soil, meeting the following requirements:

1. It shall be free of organic or other weak or compressible materials, of frozen materials, and of stones larger than 4 inches (250 mm) maximum dimension.
2. It shall be of such nature and character that it can be placed to form embankments and compacted to the specified densities in a reasonable length of time.

3. It shall be free from highly plastic clays, from all materials subject to decay, decomposition, or dissolution and from cinders or other materials which will corrode piping or other metal.
4. It shall have a maximum dry density of not less than 100 lbs. per cubic foot.
5. Material from excavation on the site may be used as ordinary fill if it meets the above requirements and is approved by the Owner's Representative.

2.03 CRUSHED STONE

- A. Crushed Stone shall be ¾" and satisfy the requirements specified in MassDOT Material Specification Section M2.01.4.

2.04 GRAVEL

- A. 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 graded in accordance with MassDOT specification section M1.03.0, Type b, Gravel Borrow.

2.05 3/8" PEA GRAVEL (FOR BIORETENTION BASIN)

- A. Pea gravel should be clean, double-washed, rounded diameter, ASTM D448 size No. 8 (3/8").

2.06 #57 CRUSHED STONE (FOR BIORETENTION BASIN AND POROUS HOT MIX ASPHALT)

- A. Crushed stone shall be #57 double-washed conforming to ASTM C 33 and gradation requirements of ASTM D 448 No. 57, as presented:

<b>Choker Course</b>	
ASTM No. 57	
Sieve Size	Percent Passing
1 ½ in	100
1 in	95 to 100
½ in	25 to 60
No. 4	0 to 10
No. 8	0 to 5

2.07 #2 OPEN GRADED RESERVOIR STONE (FOR POROUS HOT MIX ASPHALT)

- A. Crushed stone shall be #2 double-washed conforming to ASTM C 33 and the gradation requirements of ASTM D 448 No.2, as presented:

<b>Reservoir Course</b>	
ASTM No. 2	
Sieve Size	Percent Passing
3 in	100
2 ½ in	90 to 100
2 in	35 to 70
1 ½ in	0 to 15
¾ in	0 to 5

2.08 GEOTEXTILE FABRIC

- A. The geotextile shall be a non-woven fabric and shall meet the requirements of Type I Geotextile Fabric specified in the MassDOT Specifications, Subsection M9.50.0.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of granite curb, excavation of utility trench (electric conduit installation by others), Base Loop Path, Level Spreader, Pipe Outlet-Energy Dissipater, Water Quality Swale, bituminous concrete paving sub-base, concrete paving, obstructions, and deleterious materials from ground surface is specified in Division 2 Section 02100, SITE PREPARATION.
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section 01568, EROSION AND SEDIMENT CONTROL, during earthwork operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.02 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
- C. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

### 3.03 EXCAVATION

- A. Trenching shall consist of all earth excavation, within the limits specified herein, required to lay appurtenances as shown on the plans or ordered by the Engineer:
  - 1. Excavate trench to ensure sides of trench are stable.
  - 2. At all times, prevent runoff and/or surface water from entering trench.
  - 3. When ground water is present in the work area, dewater trench area to maintain stability of existing trench and imported materials. The water level shall be maintained below pipe bedding and foundation of the trench to provide a stable trench bottom. Use, as appropriate, sump pumps, well points, deep wells, geofabrics, perforated under-drains, or stone blankets of sufficient thickness to remove and control water in the trench. Maintain and control water in the trench before, during, and after the pipe installation, until the embedment is installed and sufficient backfill has been placed to prevent flotation of the pipe.
- B. Below Grade Excavation shall be such excavation required to remove unsuitable materials below the normal trench depth (as defined above) as ordered by the Engineer.

### 3.04 EXCAVATION AND SUBGRADE PREPARATION AND PROTECTION FOR PAVEMENT

- A. Excavate surfaces under pavements to indicated lines, cross sections, elevations, and subgrades.
- B. Fine grade in accordance with Section 170 of the MassDOT Standard Specifications.
- C. Compact subgrade to 95% of the Standard Proctor Maximum dry density with the exception of subgrade under bioretention basin planting soil, refer to Section 02950 PLANTING SOILS and porous hot mix asphalt, refer to Section 02795 POROUS HOT MIX ASPHALT.
- D. Notify Engineer when excavations have reached required subgrade.
- E. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

- F. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Landscape Architect, without additional compensation.

### 3.05 SUBBASE UNDER PAVEMENTS

- A. Place subbase course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course under pavements as follows:
  - 1. Shape subbase course to required crown elevations and cross-slope grades.
  - 2. Place subbase course 6 inches or less in compacted thickness in a single layer.
  - 3. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal Thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
  - 4. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698 or ASTM D 1557.

### 3.06 GRADES AND ELEVATIONS

- A. The Contract Documents indicate, in general, alignments, and grade elevations. Establish the lines and grades in conformity with the Drawings. The Owner's Representative, however, may make such adjustments in the field in grades and alignments as are found necessary in order to avoid interference with any special conditions encountered.
- B. Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- C. Provide a smooth transition between adjacent existing grades and new grades.
- D. Where not otherwise indicated, project site areas shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.
- E. Establish and maintain suitable stakes over all areas to be graded as directed, specified or required. Maintain sufficient reference points at all times during construction to properly perform the contract installation.

### 3.07 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- B. Stockpile soil materials in designated stockpile locations only.
- C. Install erosion and sediment control measures for stockpiles.

### 3.08 COMMON FILL

- A. Place common fill on subgrades free of mud, frost, snow, or ice.

### 3.09 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
- B. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
- C. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### 3.10 CONTAMINATED MATERIAL

- A. If during the course of excavation or other performance of the Work, materials on the project are encountered which may be contaminated or hazardous, stop work immediately and notify the Owner by telephone within one hour of the discovery.
- B. Follow up telephone conversation with written correspondence hand delivered within 24 hours of discovery.

### 3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 6 inches (150 mm) in loose depth. All placed soils shall be compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

### 3.12 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Scarify or remove and replace soil material to depth as directed by Owner's Representative; reshape and re-compact.
- D. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
- E. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.



### 3.13 FROST PROTECTION

- A. Frozen material shall not be placed as fill or backfill.
- B. No work shall be installed on frozen ground.
- C. Should protection fail remove frozen materials and replace with concrete or gravel borrow as directed by the Owner's Representative at no additional cost to the Owner.

### 3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it offsite at no additional cost to the Owner.

### 3.15 CLEANUP

- A. At the end of all excavation, filling and grading operations and before acceptance of the work, the Contactor shall remove all debris, rubbish, garbage, trash, and discarded material from the site. He shall dispose of them in a manner satisfactory to the Owner's Representative.
- B. The premises shall be left clean, presentable, and satisfactory.

END OF SECTION 02120

## SECTION 02630

### STORMWATER FACILITIES

#### PART 1 – GENERAL

##### 1.01 SUMMARY

- B. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to complete stormwater conveyance, drainage system, Best Management Practice (BMP) facilities and related work, as indicated on the Contract Drawings and as specified. Constructing stormwater facilities shall include, but not be limited to:

1. Bioretention basin.
2. Conveyance swale.
3. Sediment forebay.
4. Trench drain, frame and grate.
5. Cast-in-place concrete check dams.
6. Adjustable composite wood weir.
7. River stone.

- C. Refer to Section 02120, EARTH EXCAVATION, BACKFILL, FILL, AND GRADING for excavation and backfill requirements.

#### 1.02 RELATED WORK

- A. The following items of related work are specified and included in other Sections of the Specifications:
  - 1. Section 01568, EROSION AND SEDIMENT CONTROL
  - 2. Section 02100, SITE PREPARATION
  - 3. Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING
  - 4. Section 02900, PLANTING
  - 5. Section 02950, PLANTING SOILS
  - 6. Section 02952, SEEDING AND SODDING
  - 7. Section 03300, CAST-IN-PLACE CONCRETE
  - 8. Section 05500, MISCELLANEOUS METALS

#### 1.03 SUBMITTALS

- A. Shop Drawings: Contractor shall provide shop drawings and technical specifications of the following for review and approval by the Engineer:
  - 1. Sediment forebay.
  - 2. Trench drain frame and grate.
  - 3. Concrete check dams.
  - 4. Composite wood weir.
  - 5. River stone.
- B. Manufacturer's Literature: Submit one electronic copy of each manufacturer's material descriptions and/or installation instructions for each of the following:
  - 1. Trench drain frame and grate.
  - 2. Composite wood weir.
  - 3. River stone.
  - 4. Hardware Cloth (Sediment Forebay).
- C. Material Sample: Submit the following for approval by the Owner's Representative:
  - 1. Composite wood weir material.
  - 2. River stone (5 gallon bucket).
  - 3. Hardware Cloth (Sediment Forebay).
- D. As-built Drawings: At project closeout, submit record drawings of installed stormwater facilities system, overflow inverts, and products, in accordance with requirements of Division 1, Section 01701, PROJECT CLOSEOUT.
- E. Maintenance Data: Submit maintenance data and parts lists for all stormwater facilities materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual, in accordance with requirements of Division 1.

#### 1.04 PROJECT CONDITIONS

Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that storm drainage facilities may be installed in compliance with original design and referenced standards.

### PART 2 – PRODUCTS

## 2.1 TRENCH DRAIN FRAME AND GRATE

- A. Trench drain frame and grate shall conform to Section 05500 – MISCELLANEOUS METALS.
- B. Trench frame and grate shall be Neenah model R-4990-HX with type Q pattern. Neenah Foundry, 2121 Brooks Ave, Neenah, WI 54956, phone: 800-558-5075, fax: 920-729-3661, website: [www.nfco.com](http://www.nfco.com). Grate and frame shall be cast iron with natural finish.
- C. Grate shall be rated for H2O loading with a non-slip surface having a static coefficient of friction between 0.60 and 1.0 per ASTM C1020. Grates on inclines greater than 4% shall have a coefficient of 0.80 to 1.0.
- D. Trench drain frame and grate shall conform to Section 03300, CAST-IN-PLACE CONCRETE.

## 2.2 RIVER STONE

- A. River Stone material shall include stones a minimum of 6” in size, generally rounded, semi-smooth brownish gray in color with color relatively uniform and shall be subject to the approval of the Owner’s Representative.
- B. River Stone may be located from the following sources:
  - 1. Lynch Materials  
800 Salem Street  
Wilmington, MA 01887  
Tel. 978-658-3602  
[www.lynchmaterials.com](http://www.lynchmaterials.com)
  - 2. Mt. William Inc.  
1225 River Road  
Weare, NH 03281  
Tel. 603-529-7625  
[www.mtwilliaminc.com](http://www.mtwilliaminc.com)
  - 3. Defeo Materials  
15 Clay Road.  
Bethany CT 06524  
Tel. 888-884-6459  
[www.discountriverrock.com](http://www.discountriverrock.com)
- C. Filter fabric shall be non-woven geotextile filter fabric as specified in Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING

## 2.3 COMPOSITE WOOD WEIR

- A. A replacement set of composite wooden weir blocks for each check dam location shall be cut to size and distributed to the town D.P.W.

B. Composite wood material shall contain no organic filler and be made of 100% recycled material with proven structural capacity.

C. Mechanical properties shall conform to:

<u>Mechanical properties</u>	<u>Average</u>
Specific Gravity	0.75
Modulus of Rupture	2960 psi
Modulus of Elasticity	0.345 million psi
Work to Maximum Load	2.66 (pound per cubic inch)
Compression parallel to grain	1740 psi
Compression Perpendicular to Grain	690 psi
Shear parallel to grain	740 psi
Impact Bending	7500 psi
Tension parallel to grain	1250 psi

D. Composite wood shall have a minimum density of 44-50 lbs. per cubic foot.

E. Workabilities: Composite wood shall be manufactured for use with standard woodworking tools and fasteners.

F. Composite wood shall be 2x6" (nominal), 1.5"x 5.5" (actual) in size.

G. Composite wood shall resemble natural wood in color and wood grain appearance, have the same surface material and texture on all four faces and shall be subject to the approval of the Owner's Representative.

H. Contractor shall take care to ensure composite 2x6" weir boards and cast-in-place concrete weir structure slot are sized appropriately for a snug fit. Weir boards should not be loose.

#### 2.4 SEDIMENT FOREBAY

A. Sediment forebay and associated check dam shall conform to Section 03300, CAST-IN-PLACE CONCRETE.

B. Sediment Forebay Hardware Cloth shall be 1/4" or 1/2" galvanized steel.

C. Stone to be wrapped in Hardware Cloth shall be 1-2" washed stone.

#### 2.5 CHECK DAM

A. Check Dam conform to Section 03300, CAST-IN-PLACE CONCRETE.

### PART 3 – EXECUTION

#### 3.01 GENERAL

D. The Contractor shall be responsible for anticipating and locating underground utilities and obstructions.

- E. When construction appears to be in close proximity to existing utilities, the trench(es) shall be opened a sufficient distance ahead of the work or test pits made to verify the exact locations and inverts of the utility to allow for changes in line or grade.

### 3.02 GRADES AND ELEVATIONS

- A. The Contract Documents indicate, in general, alignments, grade elevations and invert elevations. The lines and grades shall be established in the field by elevations prepared by instrument survey conducted by a Registered Land Surveyor. **The grades of all storm facilities shall be in strict conformity with the Drawings.** The elevations shall be verified by a Registered Land Surveyor before plantings and vegetation are installed. The Engineer, however, may make such adjustments in the field in grades and alignments as are found necessary in order to avoid interference with any special conditions encountered.
- B. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.
- C. Establish and maintain suitable stakes over all areas to be graded as directed, specified or required. Maintain sufficient reference points at all times during construction to properly perform the contract installation.

### 3.03 EXCAVATION AND BACKFILL

- 1. Excavation and backfill shall be as shown on drawings and in accordance with Specification Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

### 3.04 BIORETENTION BASINS

- A. Bioretention basin work shall not be performed during rainy or freezing weather.
- B. Grading shall be performed to the lines and grades shown on the Drawings. All objectionable material encountered within the limits indicated shall be removed and disposed of by the Contractor.
- C. In excavation faces, all loose or protruding rocks shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to slope, cross section, and alignment shown on Drawings or as directed by the Engineer.
- D. Subgrades shall be hand-raked (at least three inches) to scarify bottoms of bioretention basins prior to aggregate placement. Subgrade of the stormwater beds shall be level: Plus or minus one-half inch (+/- 1/2") is acceptable as level.

- E. Do not compact in-situ soils. Heavy equipment shall not be used within the bioretention basin. All equipment shall be kept out of the excavated area to the maximum extent possible. The use of machinery to load any proposed stone from outside of the basin footprint is recommended.
- F. Conduct bioretention basin subgrade infiltration testing in conformance with Section, 01450, SAMPLING AND TESTING.
- G. Backfill excavated area as soon as the subgrade preparation is complete to avoid accumulation of debris.
- H. All stone that makes up the bioretention basins must remain free of sediment. If sediment enters the stone, the contractor will be required to remove the sediment and replace with clean double washed stone.
- I. Install the #57 double-washed crushed stone layer.
- J. Install the 3/8" double-washed pea gravel filter layer.
- K. After confirmation that the manufactured soil meets specs by performing the requisite gradation and chemical tests, fill the bioretention basin with manufactured soil as shown in the Plans. Place bioretention soil in 12 inches lifts and tamp lightly. Slight overfilling might be necessary to account for settlement. Presoak soil at least one day prior to final grading and landscaping to allow for settlement. After allowing for settlement, complete final grading.
- L. Install planting as shown in the Planting Plan for the bioretention basin. Plants shall be as described in Section 02900, PLANTING.
- M. Install bark mulch layer.
- N. The bioretention basin shall be isolated from direct runoff until determination by the Engineer that the new plants are rooted sufficiently into the adjacent soil such that they cannot easily be uprooted with a gentle pull.
- O. The bioretention basin shall be isolated from direct runoff until all vegetation has become established and stabilized.

### 3.05 SWALES AND CHANNELS

- A. Swale and channel work shall not be performed during rainy or freezing weather
  - B. Swales and channels shall be constructed to lines and grades as shown on Construction Documents. All objectionable material encountered within the limits indicated shall be removed and disposed of by the Contractor.
  - C. In excavation faces, all loose or protruding rocks shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to slope, cross section, and alignment shown on Drawings or as directed by the Engineer.

- D. Swale shall receive erosion protection treatment and seeding as shown on the Contract Drawings and in accordance with Section 01568, EROSION AND SEDIMENT CONTROL and Section 02952, SEEDING AND SODDING.

### 3.06 RIVER STONE

- A. Excavate to sufficient depth to allow for installation of river stone and base material. Compact crushed stone base prior to 98% standard Proctor before installing the river stone.
- B. Install River Stone and base materials to depths indicated on the Construction Documents.

### 3.07 COMPOSITE WOOD WEIR

- A. Owner's Representative shall approve wood composite material prior to product procurement and installation.
- B. Stack composite weir boards into slots in pre-cast-concrete as necessary to achieve weir elevation indicated on the Construction Documents.
- C. Composite weir boards shall fit snugly into pre-cast slot.
- D. Secure composite wood weir in place using grey non-shrink epoxy sealant. Neatly apply sealant between concrete and composite wood (bottom and sides) to form consistent seal.

#### 3.07.1 SEDIMENT FOREBAY

- A. Subgrade Preparation:
  - 1. Excavate and shape foundation soils to grades, elevations, and dimensions as indicated on the Drawings.
  - 2. Ensure foundation soil meets minimum strength requirements through proof rolling or other conventional method and is examined by the Engineer. If unacceptable foundation soils are encountered, excavate affected areas and replace these areas with suitable quality material as directed by the Engineer.
- B. Subbase Installation:
  - 1. Place non-woven geotextile fabric over subgrade, ensuring required overlaps are maintained and outer edges of geotextile fabric are buried a minimum of six (6) inches.
  - 2. Shape and compact subbase to required elevation and grade indicated on the Construction Documents. Compact to a minimum of 95 percent SPDD.
  - 3. Shape compacted surface to required elevation and grade as indicated on the drawings.

C. Concrete Pad:

1. Sediment Forebay and associated check dam shall conform to Section 03300 – CAST-IN-PLACE CONCRETE.

3.08 CHECK DAM

A. Subgrade Preparation:

1. Excavate and shape foundation soils to grades, elevations, and dimensions as indicated on the drawings.
2. Ensure foundation soil meets minimum strength requirements through proof rolling or other conventional method and is examined by the Engineer. If unacceptable foundation soils are encountered, excavate affected areas and replace these areas with suitable quality material as directed by the Engineer.

B. Subbase Installation:

1. Place non-woven geotextile fabric over subgrade, ensuring required overlaps are maintained and outer edges of geotextile fabric are buried a minimum of six (6) inches.
2. Shape and compact subbase to required elevation and grade indicated on the Construction Documents. Compact to a minimum of 95 percent SPDD.
3. Shape compacted surface to required elevation and grade as indicated on the drawings.

C. Concrete:

1. Check dam concrete shall conform to Section 03300, CAST-IN-PLACE CONCRETE.

D. Composite Wood Weir

1. Composite wood weir installation shall conform to Section 02630, STORMWATER UTILITIES.

3.09 POST - CONSTRUCTION MAINTENANCE

- A. Responsibility for the health and condition of all plantings will be the responsibility of the Contractor for the first one year after installation as provided in the Contract Documents. After this one year has expired, all vegetation maintenance responsibilities shall pass to the Owner, or their appointee.

B. Bioretention basins:

1. Contractor shall remove all trash and debris from the bioretention basin monthly, for first year after installation.
2. Inspect bioretention basin inlets and inspect and remove debris from openings (once



every two months). Remove any debris or sediment buildup that might impede flow.

3. Replace river stone that has been washed from the path (once every two months).
4. Inspect plantings and remove all weeds and invasive species by hand. Includes the removal of all plants not associated with the original planting plan. Replace individual plantings at bioretention basin inlets that are damaged and/or dead.
5. Inspect mulch. Apply clean mulch to a depth of 2-inches in the basin being careful not to smother or damage the plants (once every four months, as needed).
6. Inspect for the development of hardpan at the bottom of the basin (once, end of first year maintenance). Hardpan occurs when the soil becomes cemented, forming an impervious layer. Where this has occurred, scarify the soil to a depth of 6 inches, without damage to vegetation.

C. Conveyance Swale:

1. Remove all trash and debris from the conveyance swale (monthly).
2. Inspect conveyance swale and remove debris from clear path (once every two months). Remove any leaves, debris or sediment buildup that might impede flow.
3. Replace river stone that has been washed from the path (once every two months).
4. Inspect seeded area and remove all weeds and invasive species by hand. Includes the removal of all plants not associated with the original planting plan. Reseed eroded or damaged areas per Section 02952, SEEDING AND SODDING.

E. Trench drain:

1. Remove all trash and debris from in and around the trench drain (monthly).
2. Inspect trench drain channel for proper drainage and clear path (once every two months). Remove any leaves, debris or sediment buildup that might impede flow.
3. Replace river stone that has been washed from the path (once every two months).

F. Sediment Forebay:

1. Remove all trash and debris from in and around the sediment forebay (monthly).
2. Inspect sediment forebay weir for proper drainage and function (monthly). Remove any leaves, debris or sediment buildup that might impede flow.

3. Remove sediment using vacuum hose or by shoveling.
4. Replace river stone that has been washed from the path (biannually).

G. Check Dams:

1. Remove all trash and debris from in and around the check dams (monthly).
2. Inspect for proper drainage, function and clear path (once every two months).  
Remove any leaves, debris or sediment buildup that might impede flow.
3. Ensure composite wood weir is in good condition and functioning properly at intended elevation.
4. Replace river stone that has been washed from the path (once every two months).

END OF SECTION 02630

SECTION 02772

GRANITE CURB

PART 1 - GENERAL

## 1.01 SUMMARY

- A. The work of this Section consists of providing labor, equipment, materials, incidental work, and construction methods necessary to furnish and install granite curbstones on a gravel and concrete foundation, as indicated on the Contract Documents and as specified, including, but not limited to:

1. Granite curb for flush curbing and boardwalk retrofit transition abutment.

## 1.02 RELATED WORK UNDER OTHER SECTIONS

- A. The following related work will be performed under the designated SECTIONS:

1. Section 02100, SITE PREPARATION
2. Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING
3. Section 02795, POROUS HOT MIX ASPHALT
4. Section 02800, SITE IMPROVEMENTS
5. Section 02952, RESTORATION SEEDING
6. Section 03300, CAST-IN-PLACE CONCRETE

## 1.03 REFERENCES

- A. The following standards shall apply to the work of this Section.

1. Massachusetts Department of Transportation (MassDOT):  
Standard Specifications for Highways and Bridges (herein referred to as the MassDOT Standard Specifications).

## 1.04 SUBMITTALS

- A. Submit name of granite quarry supplying granite curbing for approval by the Owner's Representative.
- B. Submit complete shop drawings of all granite curbing items for Owner's Representative's approval.
1. Shop drawings shall indicate size, dimension, and finish of each curb type.

- 2. Submit complete schedule for quantity, length, and size for all curbing on the project.
- C. Submit concrete design mix for concrete cradle at curb.
- D. Sample: 1 straight section at least 12 inches in length, for approval on site.

#### 1.05 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.
- B. Granite for all curbing shall be supplied from a single source for entire project.
- C. Codes and Standards
  - 1. All materials, methods of construction and workmanship shall conform to applicable requirements of ASTM Standards unless otherwise specified.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Granite curb units shall be delivered to the job adequately protected from damage during transit.
- B. Curb shall be protected against staining, chipping, and other damage. Cracked, badly chipped, or stained units will be rejected and shall not be employed in the work.
- C. Store pallets of granite curbing on pavement or other hard, durable surfaces that will not compact as a result of the weight of the pallets of curbing. Prevent steel strapping from pallets from rusting and staining of pavement. Remove and replace all pavement stained by rusting steel strapping of pallets.

#### 1.07 GUARANTEES

- A. The Contractor shall guarantee all work for one year from the date of Substantial Completion from damage due to improper installation and improper use.

### PART 2 - PRODUCTS

#### 2.01 GRANITE CURB

A. General

1. All granite curb and edging shall be of structural granite and be hard and durable. It shall be light gray in color, free from seams and other structural imperfections or flaws which would impair its structural integrity and of a smooth splitting appearance. Natural variations characteristic of the deposit will be permitted for all curbing.
2. All granite curb to be used in this Contract shall be quarried from the same parent material source and shipped to the Contractor at the same time, regardless of construction phasing.
3. Test samples of curbing shall conform to requirements of ASTM C615.
4. Whenever curbing is sawed, all surfaces that are to be exposed shall be thoroughly cleaned and any iron rust or iron particles removed by sand blasting. Any saw mark in excess of 1/8 inch shall be removed.

- B. All granite curbing shall conform to the Standard Specifications Section M9.04.0, M9.04.1, and M9.04.6 for granite curb type VA4.

2.02 CEMENT MORTAR

- A. Mortar for pointing joints between curbstones shall be a cement mortar composed of one part Portland cement and two parts sand, by volume with sufficient water to form a workable, stiff mixture.
- B. Cement, water and sand for mortar shall conform to the requirements of Subsections M4.02.01, M4.02.02, and M4.02.04 respectively in the Standard Specifications.

2.03 CONCRETE

- A. Concrete for Foundation Cradle at Curb: Refer to Section 03300 CAST-IN-PLACE CONCRETE.

2.04 CRUSHED STONE BASE

- A. Crushed Stone Base: Refer to Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

PART 3 - EXECUTION

3.01 GRANITE CURBING

- A. Trench:
  - 1. Excavate trench a width a minimum of 18 inches or as shown on Construction Documents. Excavate to subgrade as shown on the Construction Documents.
  - 2. Spread and compact curb bedding at least 6 inches deep and at least 18 inches wide, in accordance with the details indicated on the Drawings. Tamp or ram the gravel bedding until it is unyielding.
  
- B. Setting Curb:
  - 1. Set curbing vertically true. Set to the line and grade indicated on the Drawings.
  - 2. All spaces under each piece of curbing shall be filled with gravel and thoroughly tamped so the whole length is completely supported on gravel.
  - 3. Set pieces of curbing as close together as possible.
  - 4. If pieces of curbing come from different quarries or have different color or appearance, segregate each so as to give the finished curbing a uniform appearance.
  - 5. Place continuous concrete in trench along the front side of the curbing as indicated on the Drawings.
  - 6. Place concrete backing on the back side of each piece of granite curb.
  - 7. Backfill and tamp with gravel on the back side of the curbing in the spaces between the concrete backing.
  - 8. Ensure that the entire trench is backfilled with gravel and thoroughly tamped after the curbing is set. Do not disturb the line, grade or trueness of the curbing during the backfilling and tamping of the trench.
  
- C. Protect curbing from damage by subsequent Project Work. Clean as required for a new and workmanlike appearance.

END OF SECTION 02772

SECTION 02795

POROUS HOT MIX ASPHALT

#### 1.01 SUMMARY

- A. The work of this Section consists of furnishing, installing, and testing the porous hot mix asphalt path as indicated and specified.

#### 1.02 RELATED SECTIONS

- A. Division 1: All Sections
- B. Section 02120: EARTH EXCAVATION, BACKFILL, FILL, AND GRADING
- C. Section 02770: GRANITE CURB

#### 1.03 REFERENCES

- A. Commonwealth of Massachusetts, Massachusetts Department of Transportation, Highway Division, Standard Specifications for Highways and Bridges (MHD Standard Specifications).
- B. American Society for Testing and Materials (ASTM).
- C. American Association of State Highway and Transportation Officials (AASHTO).
- D. University of New Hampshire Stormwater Center: Design Specifications for Porous Asphalt Pavement and Infiltration Beds, current edition.

#### 1.04 PROJECT CONDITIONS

- A. Protection of Existing Improvements:
  - 1. Protect adjacent work from splashing of paving materials. Remove all stains from exposed surfaces of paving, structures, and grounds. Remove all waste and spillage.
  - 2. Do not damage or disturb existing improvements or vegetation. Provide suitable protection where required before starting work and maintain protection throughout the course of the work.
  - 3. Restore damaged improvements, including existing paving on or adjacent to the site that has been damaged as a result of construction work, to their original condition or repair as directed to the satisfaction of the Engineer, and authority having jurisdiction at no additional cost.
- B. Weather Limitations:
  - 1. Porous Hot Mix Asphalt Paving shall not be placed between October 31 and May 1. In areas with existing trees nearby, the Engineer may restrict the paving schedule further in the fall due to leaves dropping and leaf litter. When it is in the public

interest, only the Engineer or his/her agents may adjust the air temperature requirement or extend the dates of the paving season.

2. The material shall not be placed when the ambient air temperature at the paving site in the shade away from artificial heat is below 50° F or when the actual ground temperature is below 55° F.
3. The Contractor shall not pave on days when the ground is damp or rain is forecast for the day, unless a change in the weather results in favorable paving conditions as determined by the Engineer. The pavement shall not be installed on wet or damp aggregate.

C. Protection of Porous Paving Beds

1. Porous pavement beds shall not be used for equipment or materials storage during construction, and under no circumstances shall vehicles be allowed to deposit soil on paved porous surfaces.
2. Contractor shall take any other necessary steps to prevent sediment from washing into beds or onto the paved porous surfaces during site development. For this reason, the porous pavement should be constructed late in the project schedule. Temporary controls need to remain in place until the site is stabilized. When the site is fully stabilized, temporary sediment control devices shall be removed. For temporary sediment control devices refer to the Drawings.

1.05 GUARANTEE

- A. During the one-year guarantee period on workmanship and materials, the Contractor shall maintain the surfacing with quarterly vacuum sweeping to remove sediment and debris.

1.06 QUALITY ASSURANCE

- A. Qualifications of workers: Use adequate numbers of skilled workers who are trained in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Layout and Grading: After staking and laying out the work, and before beginning final construction, obtain approval of layout and grades from Owner's Representative prior to paving. Contractor shall make adjustments as determined by Owner's Representative.
- C. The Contractor and his Subcontractors shall inspect all subbases for unstable, unsuitable



or improperly prepared areas. Contractor shall not begin work over unaccepted areas. Beginning work means the Contractor and his Subcontractors accept the subbase, previous work and conditions and shall be held responsible for any corrections required to properly implement the Construction Documents.

#### 1.07 SUBMITTALS

- A. Submit a list of materials proposed for work under this Section including the name and address of the materials producer and the location from which the materials are to be obtained.
- B. Submit certificates, signed by the materials producer and the paving subcontractor, stating that materials meet or exceed the specified requirements.
- C. The asphalt mixing plant shall certify the aggregate mix, abrasion loss factor, polymer additive, binder draindown, tensile strength ratio, resistance to stripping by water and asphalt content in the mix.
- D. Submit name and contact information of company responsible for performing paving operations as soon as this information becomes available.

#### PART 2 – PRODUCTS

##### 2.01 NON-WOVEN GEOTEXTILE FABRIC

- A. Non-woven geotextile shall conform to Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

##### 2.02 RESERVOIR COURSE (#2 OPEN GRADED DOUBLE WASHED STONE)

- A. Reservoir course aggregate shall conform to Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

##### 2.03 CHOKER COURSE (#57 DOUBLE WASHED STONE)

- A. Choker course aggregate shall conform to Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

##### 2.04 POROUS HOT MIX ASPHALT

- A. Porous Hot Mix Asphalt Paving shall conform to the Open-Graded Friction Course (OGFC) requirements of MHD Standard Specifications M3.11.00 with the exceptions as hereinafter noted.

Porous Asphalt Mix Design Criteria

U.S. Standard Sieve Size	Percent Passing
5/8"	-
1/2"	100
3/8"	85-100
No. 4	20-30
No. 8	5-15
No. 200	0-4

Test Criteria	Specification
PGAB, %	6.0-7.0
Air Void Content	18%-22%
Binder Draindown	≤ 0.3%

- B. Porous Hot Mix Asphalt Paving shall be placed in two 2-inch lifts.
- C. Contractor shall allow time for testing of porous paving mix by independent testing company at batch plant to assure conformance to project specifications.

2.05 TACK COAT (VERTICAL SURFACES ONLY):

- A. Emulsified asphalt: AASHTO M140/ASTM D 997 or AASHTO M 208/ASTM D 2397, RS-1 or CRS-1; CSS-1, CSS-1h, SS-1, SS-1h.

No tack coat shall be applied on any part of the permeable pavement horizontal surface.

PART 3 – EXECUTION

3.01 SOIL INFILTRATION TESTING

- A. Infiltration testing shall be conducted on the subgrade and shall conform with Section 01450, SAMPLING AND TESTING.

3.02 GEOTEXTILE FABRIC, CHOKER AND RESERVOIR COURSES

A. Grade Control:

1. Establish and maintain required lines and elevations. The Engineer shall be notified for review and approval of final stake lines for the work before construction work is to begin. Finished surfaces shall be true to grade and even, free of roller marks and free of puddle forming low spots. All areas must drain freely. Excavation elevations should be within  $\pm 0.1$  ft ( $\pm 3$  cm).
2. If, in the opinion of the Engineer, based upon reports of the testing service and inspection, the quality of the work is below the standards which have been specified, additional work and testing will be required until satisfactory results are obtained.
3. The Engineer shall be notified at least 24 hours prior to all porous media bed and porous pavement work.

B. Subgrade Preparation:

1. Native subgrade refers to materials beyond the limit of the excavation. The existing native subgrade material under all bed areas shall NOT be compacted or subject to excessive construction equipment traffic prior to geotextile and stone bed placement.
2. Where erosion of the native material subgrade has caused accumulation of fine materials and/or surface ponding, this material shall be removed with light equipment and the underlying soils scarified to a minimum depth of 6 inches with a York rake or equivalent and light tractor.
3. Bring subgrade to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction before the placing of the stone subbase.
4. All bed bottoms shall be as level as feasible to promote uniform infiltration. For pavements subbases constructed on grade, soil or fabric barriers shall be constructed along equal elevation for every 6-12" of grade change to act as internal check dams. This will prevent erosion within the subbase on slope.
5. Infiltration testing shall be conducted on the subgrade and shall conform with Section 01450, SAMPLING AND TESTING.

C. Geotextile Fabric, Choker and Reservoir Course Installation:

1. Upon completion of subgrade work, the Engineer shall be notified and shall inspect at his/her discretion before proceeding with gravel bed installation.

2. Geotextile fabric, reservoir, and choker course shall be placed immediately after approval of subgrade preparation. Any accumulation of debris or sediment which has taken place after approval of subgrade shall be removed prior to installation of geotextile at no extra cost to the Owner.
3. Place geotextile in accordance with manufacturer's standards and recommendations. Adjacent strips of geotextile shall overlap a minimum of sixteen inches (16"). Secure geotextile at least six inches (6") outside of bed and take any steps necessary to prevent any runoff or sediment from entering the storage bed.
4. Install reservoir gravel in 6-inch maximum lifts. Lightly compact each layer with equipment, keeping equipment movement over storage bed subgrades to a minimum. Install gravel to grades indicated on the drawings.
5. Install choker course evenly over surface of reservoir course, sufficient to allow placement of porous hot mix asphalt paving course and notify Engineer for approval.
6. Install reservoir and choker course aggregates to a maximum 95% standard Proctor compaction.
7. Compaction of subbase course material shall be done with a method and adequate water to meet the requirements. Rolling and shaping shall continue until required density is attained. Water shall be uniformly applied over the subbase course materials during compaction in the amount necessary for proper consolidation.
8. Rolling and shaping patterns shall begin on the lower side and progress to the higher side of the subbase course while lapping the roller passes parallel to the centerline. Rolling and shaping shall continue until each layer conforms to the required grade and cross-section and the surface is smooth and uniform.
9. Following placement of the subbase aggregate, the geotextile shall be folded back along all bed edges to protect from sediment washout along bed edges. At least a four inch edge strip shall be used to protect beds from adjacent bare soil. This edge strip shall remain in place until all bare soils contiguous to beds are stabilized and vegetated. In addition, take any other necessary steps to prevent sediment from washing into beds during site development. When the site is fully stabilized, temporary sediment control devices shall be removed.

### 3.03 TESTING OF POROUS HOT MIX ASPHALT PAVING COURSE DURING PRODUCTION

- A. The Contractor shall provide at Contractors' expense and the Engineer's approval an independent laboratory testing company to oversee and document mix production. ATC, 40 Straffello Drive, Unit: G, Avon, MA 02322, <http://www.atcassociates.com/>, 508-588-0886 is an example of a testing company that has been used in the region.
- B. The testing company shall test for the following:

<u>Test</u>	<u>Min. Frequency</u>	<u>Test Method</u>
Temperature in Truck at Plant	6 times per day	
Gradation day, or (c) 3 per job	greater of either (a) 1 per 500 tons, AASHTO T30	(b) 2 per
Binder Content day, or (c) 3 per job	greater of either (a) 1 per 500 tons, AASHTO T164	(b) 2 per
Air Void Content day, or (c) 3 per job	greater of either (a) 1 per 500 tons, ASTM D6752	(b) 2 per
Binder Draindown day, or (c) 1 per job	greater of either (a) 1 per 500 tons, ASTM D6390	(b) 1 per

If an analyzed sample is outside the testing tolerances immediate corrective action will be taken. After the corrective action has been taken the resulting mix will be sample and tested. If the re-sampled mix test values are outside of the tolerances the Engineer will be immediately informed. The Engineer may determine that it is in the best interest of the project that production is ceased. The Contractor will be responsible for all mix produced for the project.

- C. The paving mixture produced should not vary from the design criteria for aggregate gradation and binder content by more than the tolerances in the following table:

<u>U.S. Standard Sieve Size</u>	<u>Percent Passing</u>
¾" (19.0mm)	-
½" (12.5mm)	±6.0
3/8" (9.5mm)	±6.0

No. 4 (4.75mm)	±6.0
No. 8(2.36mm)	±4.0
No. 200(0.075mm)	±1.0
%PGAB	±0.3
Air Voids	±2.0

Should the paving mixture produced vary from the designated grading and asphalt content by more than the above tolerances, the appropriate production modifications are to be made until the porous hot mix asphalt paving mixture is within these tolerances.

Samples of the mixture, when tested in accordance with AASHTO T164 and T30, shall not vary from the grading proportions of the aggregate and binder content designated by the Engineer by more than the respective tolerances specified above and shall be within the limits specified for the design gradation.

- D. Should the hot mix asphalt porous paving mixture not meet the tolerances specified in this section upon repeat testing, the Engineer may reject further loads of mix. Mix that is loaded into trucks during the time that the plant is changing operations to comply with a failed test shall not be accepted, and should be recycled at the plant.

#### 3.04 POROUS HOT MIX ASPHALT PAVING COURSE

- A. The mixing plant, hauling and placing equipment, and construction methods shall be in conformance with the applicable requirements of MHD Standard Specifications Section 420, except as modified by this Section.
- B. The use of surge bins shall not be permitted.
- C. No mix shall be placed on wet or damp surfaces. When surface and ambient temperatures are 55°F and rising, the Contractor shall use mix prepared and placed in accordance with the specified requirements of the mix hereinbefore designated as Porous Hot Mix Asphalt Paving Course.
- D. Preparation of Asphalt Material. Mixing temperatures for OGFC shall be between 265°F and 325°F. A continuous supply of asphalt material shall be furnished to the mixer at a uniform temperature.
- E. Preparation of Aggregates. The aggregate for the mixture shall be dried and heated at the mixing plant before being placed in the mixer. Flames used for drying and heating shall be properly adjusted to avoid damaging the aggregate and depositing soot or unburned fuel on the aggregate. Mineral filler, if required to meet the grading requirements, shall be added in a manner approved by the Engineer after the aggregates have passed through

the dryer. The above preparation of aggregates does not apply for drum-mix plants.

- F. **Mixing.** The dried aggregate shall be combined in the mixer in the amount of each fraction of aggregate required to meet the job-mix formula and thoroughly mixed prior to adding the asphalt material.
1. The dried aggregates shall be combined with the asphalt material in such a manner as to produce a mixture that when discharged from the pugmill is at a target temperature in the range that corresponds to an asphalt cement viscosity of 700 to 900 centistokes and within a tolerance of  $\pm 20$  °F.
  2. After the required quantity of aggregate and asphalt material has been introduced into the mixer, the materials shall be mixed until a complete and uniform coating of the particles and a thorough distribution of the asphalt material throughout the aggregate is secured. The mixing time will be regulated by the Engineer, and a suitable locking means shall be provided for these regulations.
  3. All plants shall have a positive means of eliminating oversized and foreign material from being incorporated into the mixer.
- G. **Hauling Equipment.** Trucks used for hauling asphalt mixture shall have tight, clean, smooth metal bodies. The Contractor shall apply a thin coat of a non-petroleum based or soap solution to prevent the mixture from adhering to the bodies. Each truck shall have a cover of canvas or other suitable material of such size sufficient to protect the mixture from the weather. When necessary to ensure delivery of material at the specified temperature, truck bodies shall be insulated, and covers shall be securely fastened.
- H. **Placing Equipment.** The asphalt paver shall be a self-propelled unit with an activated screed or strike-off assembly, capable of being heated if necessary, and capable of spreading and finishing the mixture without segregation for the widths and thicknesses required. The screed shall be adjustable to provide the desired cross-sectional shape. The finished surface shall be of uniform texture and evenness and shall not show any indication of tearing, shoving, or pulling of the mixture. The machine shall, at all times, be in good mechanical condition and shall be operated by competent personnel.

Pavers shall be equipped with the necessary attachments, designed to operate electronically, for controlling the grade of the finished surface.

The adjustments and attachments of the paver will be checked and approved by the Engineer before placement of asphalt material.

- I. **Rollers.** Rollers shall be in good mechanical condition, operated by competent personnel, capable of reversing without backlash, and operated at speeds slow enough to avoid displacement of the asphalt mixture. The mass (weight) of the rollers shall be sufficient to compact the mixture to the required density without crushing of the aggregate. Rollers shall be equipped with tanks and sprinkling bars for wetting the rolls. Rollers shall be two-axle tandem rollers with a gross mass (weight) of not less than 7 metric tons (8 tons)

and not more than 10 metric tons (12 tons) and shall be capable of providing a minimum compactive effort of 44 kN/m (250 pounds per inch) of width of the drive roll. All rolls shall be at least 1 m (42 inches) in diameter.

A rubber tired roller will not be required on the open graded asphalt friction course surface.

- J. Conditioning of Existing Surface. Contact surfaces such as curbing and manholes shall be painted with a thin, uniform coat of Type RS-1 emulsified asphalt immediately before the asphalt mixture is placed against them.
- K. Spreading and Finishing. Placing temperature shall be between 265° F and 325° F. As placing temperature is a critical factor in this type of mix, hauling time to the project should be limited so as to avoid excessive drain down and mix temperature from dropping below the required minimum. **The combined handling and hauling of the mix should be limited to 40 miles or 1 hour.** All mixes should be covered during transportation.

The Contractor shall protect all exposed surfaces that are not to be treated from damage during all phases of the paving operation.

Porous Asphalt for porous paving shall be placed in two 2-inch lifts. Take care between lifts to ensure that the porous asphalt layers bond completely. Keep time between layer placements to a minimum. Keep the first layer clear from dust and moisture, and minimizing traffic on the underlying layer. Path edges shall be uniform and continuous without deviations; use edge or form in place. The Contractor shall protect exposed surfaces that are not to be treated from damage during all phases of the paving operation. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture shall be spread, raked, and luted by hand tools. No material shall be produced so late in the day as to prohibit the completion of spreading and compaction of the mixture during daylight hours, unless night paving has been approved for the project. No construction equipment will be permitted on material placed until the material has been thoroughly compacted and has been permitted to cool to below 100°F for subsequent pavement lifts. The use of water to cool the pavement is permitted. No construction equipment will be allowed on the pavement after surface course placement for a minimum of 48 hours.

The Engineer reserves the right to require that all work adjacent to the pavement, such as cleanup, and turf establishment, is completed prior to placing the surface course when this work could cause damage to the pavement.

No material shall be produced so late in the day as to prohibit the completion of spreading and compaction of the mixture during daylight hours, unless night paving has been approved for the project.

- L. Compaction. Immediately after the asphalt mixture has been spread, struck off, and



surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. The compaction objective is 18-22% in place void content.

1. The surface shall be rolled when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving.
2. The number, mass (weight), and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. Generally, one breakdown roller will be needed for each paver used in the spreading operation.
3. To prevent adhesion of the mixture to the rolls, rolls shall be kept moist with water or water mixed with very small quantities of detergent or other approved material. Excess liquid will not be permitted.
4. Along forms, curbs, and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot or lightly oiled hand tampers, smoothing irons or with mechanical tampers. On depressed areas, either a trench roller or cleated compression strips may be used under the roller to transmit compression to the depressed area.
5. Other combinations of rollers and/or methods of compacting may be used if approved in writing by the Engineer, provided the compaction requirements are met. Generally, three coverages (one pass) of a static steel roller are sufficient.
6. Breakdown rolling when the mix temperature is between 265 to 325°F; Intermediate rolling when the mix temperature is between 200 to 275°F; Finish rolling when the mix temperature is between 150 to 200°F.
7. Unless otherwise specified, the longitudinal joints shall be rolled first. Next, the Contractor shall begin rolling at the low side of the pavement and shall proceed towards the center or high side with lapped rollings parallel to the centerline. The speed of the roller shall be slow and uniform to avoid displacement of the mixture, and the roller should be kept in as continuous operation as practical. Rolling shall continue until all roller marks and ridges have been eliminated.
8. Rollers will not be stopped or parked on any porous pavement.
9. It shall be the responsibility of the Contractor to conduct whatever process control the Contractor deems necessary. Acceptance testing may be conducted by City-authorized personnel using cores taken by the Contractor, witnessed by the Engineer, at no additional cost to the City.
10. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture. The mixture shall

be compacted to conform to the surrounding area. Any area showing an excess or deficiency of bitumen shall be removed and replaced. These replacements shall be at the Contractor's expense.

11. **After final rolling, no vehicular traffic of any kind shall be permitted on the surface until cooling and hardening has taken place, and in no case within the first 48 hours.** Provide barriers as necessary at no extra cost to the Owner to prevent vehicular use; remove at the discretion of the Engineer.

M. Joints:

1. Joints between old and new pavements or between successive day's work shall be made to ensure a thorough and continuous bond between the old and new mixtures. Whenever the spreading process is interrupted long enough for the mixture to attain its initial stability, the paver shall be removed from the mat and a joint constructed.
2. Butt joints shall be formed by cutting the pavement in a vertical plane at right angles to the centerline and not extend into the underlying pavement layer. The butt joint shall be thoroughly coated with Type RS-1 emulsified asphalt just prior to depositing the paving mixture when paving resumes.

N. Surface Tolerances. The surface will be tested by the Engineer using a straightedge at least 10 feet in length at selected locations. Any variations exceeding 1/4 inch between any two contact points shall be deemed unsatisfactory. Allowances will be calculated for vertical curve areas.

O. Surface Protection: Work shall be done expertly throughout, without staining or injury to other work. Transition to adjacent impervious asphalt paving shall be merged neatly with flush, clean line. Finished paving shall be even, without pockets, and graded to elevations and grades shown on drawing.

P. Porous pavement beds shall not be used for equipment or materials storage during construction, and under no circumstances shall vehicles be allowed to deposit soil on paved porous surfaces.

Q. Repair of Damaged Paving. Any existing paving on or adjacent to the site has been damaged as a result of construction work shall be repaired to the satisfaction of the Owner without additional cost to the Owner.

### 3.05 FIELD QUALITY CONTROL

A. The full permeability of the pavement surface shall be tested by application of clean water at the rate of at least 5 gpm over the surface, using a hose or other distribution device at no extra cost to the Owner. All applied water shall infiltrate directly without puddle formation or surface runoff, and shall be observed by the Engineer prior to and after the placement of the surface course.

- B. Continually check for mixture temperature uniformity such that the paved mat is kept within +/- 20°F of the JMF using random temperature readings.
- C. Inspect each truckload of material for draindown, segregation and other material qualities per the QC Plan prior to offloading.
- D. Test in-place base/surface course for compliance with requirements for thickness, in-place air voids and grade. Repair or remove and replace unacceptable work as directed by the Engineer. Establish and maintain required lines and elevations. The Engineer shall be notified for review of final stake lines before construction work is to begin. Finished surfaces shall be true to grade and even, free of roller marks and free of low spots/depressions. All areas must drain.
- E. Test finished surface for smoothness using a 10-foot straightedge applied parallel with and at right angles to the centerline of the paved area. Surface will not be accepted if gaps or ridges exceed 1/4".
- F. If, in the opinion of the Owner, based upon Contractor Quality Control Reports of the testing services and inspections, the quality of the work is below the standards which have been specified, additional work and testing will be required until satisfactory results are obtained at no additional cost to the owner.

### 3.06 MATERIAL ACCEPTANCE

- A. Acceptance Sampling and Testing: All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section shall be performed by the Contractor.
  - 1. Plant Produced Material: Plant produced material may be tested for gradation, asphalt binder content, air voids and drain down on a random basis.
  - 2. Field Placed Material: Material placed in the field shall be tested for in-place air voids, compacted thickness, and surface tolerance on a random basis, in accordance with ASTM D3665.
- B. Acceptance Criteria: Acceptance will be based on the following characteristics of the hot mix asphalt and completed pavement on a material course.
  - 1. Material Acceptance:
    - a. Plant Produced Material
      - 1). Adherence to the Quality Control Plan
      - 2). Plant air voids
      - 3). Gradation

- 4). Asphalt binder content
- 5). Mixture Temperature
- 6). Fiber content
- 7). PGAB Documentation

b. Field Placed Material

- 1). Adherence to the Quality Control Plan
- 2). In-Place Air Voids
- 3). Thickness
- 4). Inferior Material/Segregation
- 5). Draindown
- 6). Smoothness
- 7). Grade
- 8). Permeability

2. Inferior Material: Material not conforming to specification requirements shall be subject to corrective action, production suspension, rejection, removal, or reduced payment as determined by the Owner.

The Engineer may at any time, notwithstanding previous acceptance, notify the Contractor of inferior material and recommend the rejection of any Porous Asphalt which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, draindown, or improper mix temperature. Such recommendation may be based on only visual inspection or temperature measurements.

3. Grade: The finished surface of the pavement shall not vary from the gradeline elevations and cross sections shown on the plans by more than 1/2 inch; however positive drainage must be achieved. The Contractor shall remove deficient areas and replace with new material. Sufficient material shall be removed to allow at least 1.5 inches (37.5mm) of porous hot mix asphalt to be placed. Milling or skin patching for correcting low areas shall not be permitted. The Contractor shall make tests for conformity with the specified crown and grade immediately after initial compaction. Any variation shall be corrected by the removal or addition of materials and by continuous rolling.
4. Shaping Edges: Edges shall be beveled while still hot with the back of a lute or

smoothing iron and thoroughly compacted by tampers or by other satisfactory methods.

C. Corrective Methods: The corrective method(s) chosen by the Contractor shall be performed at the Contractor's expense, including all necessary equipment and traffic control.

1. Areas of removal and replacement shall be removed the full width of the paver pass. The removal areas shall be reconstructed with a transverse butt joint, using a transverse saw cut perpendicular to the paver pass.
2. Replacement materials shall be placed in sufficient quantity so the finished surface will conform to grade and smoothness requirements. The corrective area shall conform to all material and compaction specification requirements.
3. When the corrective work consists of an overlay, the overlay shall cover those paver passes sufficient to correct the defects. The area overlaid shall be placed with a transverse butt joint using a transverse saw cut and asphalt removal.
4. All materials shall meet contract requirements. The overlay shall be placed so the finished surface will conform to grade and smoothness requirements. The overlay area shall be compacted to the specified density.
5. The Engineer may retest any sections where corrections were made to verify that the corrections produced a surface that conforms to the grade and smoothness requirements.

### 3.07 POST-CONSTRUCTION MAINTENANCE

- A. During the guarantee period, the Porous Hot Mix Asphalt paving shall be inspected for cracks, water ponding (failure to infiltrate), or other failures quarterly.
- B. Pavement surface shall be vacuumed with walk behind vacuum to remove sediment and organic debris. Contractor shall be responsible for a minimum of (2) seasonal vacuumings as follows: Fall: After leaf-drop, mid-November; Spring: After May 1<sup>st</sup>
  1. Walk behind vacuum shall be Little Wonder Pro Vac SP, or approved equal.
  2. Water should **NOT** be used during vacuuming and surface shall be completely dry for 24 hour period prior to vacuuming.
  3. Vacuuming shall only take place in temperatures above freezing.
  4. If the porous surface has become clogged, vacuuming will not be enough to restore infiltration. Power washing must be combined with regenerative sweeping to restore clogged areas. This should occur at mid pressure typically less than 500 psi and at an angle of 30 degrees or less. **Powerwashing at a higher rate can cause**

**material to be forced in further blocking porous pavement pours.** Power washing should be followed by vacuuming once the surface has been allowed to dry.

5. Coordinate vacuum work schedule with City staff, provide at least one (1) week notification prior to scheduling work.

C. As needed. Ensure that all upgradient landscaping areas are well maintained to prevent soil from being transported onto the pavement. In early Spring remove any sediment buildup at curbs. Fill potholes and cracks with traditional patching mixes unless more than 10 percent of the area needs repair. If large areas (10 percent or more of the total porous paving area) need repair, consult the porous paving installer. Spot-clogging can be alleviated by drilling half-inch diameter holes through the porous paving layer every few feet.

D. Do not store materials such as sand/salt, mulch, soil, yard waste, and other stock piles on porous surfaces.

### 3.08 POST-INSTALLATION POROUS HOT MIX ASPHALT INFILTRATION TESTING

A. Contractor shall verify the surface infiltration using test method ASTM C1701/C1701M-09.

END OF SECTION 02795

## SECTION 02800

### SITE IMPROVEMENTS

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. The work of this Section consists of furnishing and installing all site improvements and related items as indicated on the Drawings and/or as specified herein and includes, but is not limited to, the following:
1. Installation of Wheelchair Accessible Picnic Table.
  2. Placed Boulders (reset and new).
  3. Boardwalk Bench.
  4. Timber Log Elements: Onsite placement, base material preparation and backfilling.

##### 1.02 RELATED WORK

- F. The following items of related work are specified and included in the following Sections:
1. Section 02100, SITE PREPARATION
  2. Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING
  3. Section 02772, GRANITE CURB
  4. Section 02795, POROUS HOT MIX ASPHALT
  5. Section 03300, CAST-IN-PLACE CONCRETE
  6. Section 06100, ROUGH CARPENTRY

##### 1.03 REFERENCES

- A. Unless otherwise specified or indicated, materials and workmanship shall conform to the latest edition of the following standards, codes, specifications, requirements and regulations:
1. Standard Specifications: The Commonwealth of Massachusetts, Highway Department, Standard Specifications for Highways and Bridges, latest edition.
  2. ASTM: American Society for Testing and Materials.

A36	Structural Steel
A53	Pipe, Steel, Black and Hot-dipped, Zinc-coated
A120	Standard Galvanized Steel Pipe
A153	Zinc Coating (Hot-dip) on Iron and Steel Hardware
A386	Zinc Coating (Hot-dip) on Assembled Steel Products.
A325	High Strength Bolts

3. AISI: American Steel and Iron Institute.

4. AWS: American Welding Society.

D1.1 Structural Welding Code

#### 1.04 SUBMITTALS

- A. At least thirty (30) days prior to intended use, the Contractor shall provide the following samples and submittals for approval. Do not order materials until Owner's Representative's approval of samples, certifications and/or test results has been obtained. Delivered materials shall closely match the approved samples. Samples and approvals which are not obtained prior to the ordering of materials or the completion of work, shall result in possible disapproval of obtained materials or completed work.
- B. Manufacturer's Literature: Submit one electronic copy of each manufacturer's material descriptions and/or installation instructions for each of the following:
1. Wheelchair Accessible Picnic Table (Product data, installation instructions, maintenance instructions).
  2. Landscape Boulder (sourcing photos of stockpiled boulders for tagging).
  3. Boardwalk Bench (size, dimensions, finish, color, material).
- C. Shop Drawings:

Submit detailed Shop Drawings for each item required to be fabricated or installed under this Section. Include plans, sections and details as required to show all materials, layout, dimensions, jointing and connections for all items required. Shop drawings required are as follows:

1. Wheelchair Accessible Picnic Table (dimensions, material finish and color, all hardware and connections).
2. Boardwalk Bench (including dimensions, materials, hardware and connection to decking, powder coat color).



Contractor shall take measurements and verify dimensions on site at area of placement prior to submitting Shop Drawings and constructing samples.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store work under this Section in a manner to prevent wracking or stress of components, and to prevent mechanical damage or damage by the elements.
- B. Items which become rusted or damaged because of non-compliance with these conditions shall be rejected and replaced without additional cost to the Owner.
- C. Deliver work to the site in sufficient time to avoid delay in job progress and at such times as to permit proper coordination of the various parts.
- D. Deliver bolts and other small items required for erection of work under this Section bundled with their respective items.
- E. Store all site furnishing products in original, undamaged packaging in dry location until time of installation.
- F. Handle powder coated products carefully to prevent any damage to the finish.

#### 1.06 GUARANTEE

- A. Furnish and deliver standard written manufacturer's guarantee in Owner's name covering all materials and workmanship under this Section, in addition to, and not in lieu of, guarantee requirements set forth under GENERAL CONDITIONS and SPECIAL PROVISIONS, and other liabilities which the Contractor may have by law or other provisions of the Contract Documents.
- B. Supplier shall pay for repairs of any damage to any part of the project caused by defects in his work and for any repair to the materials or equipment caused by replacement. All repairs are to be done to the satisfaction of the Owner's Representative.
- C. Any part of the work installed under this contract requiring excessive maintenance shall be considered as being defective and shall be replaced by the Supplier during the one-year period at no cost to the Owner.

#### 1.07 WARRANTY

- A. Wheelchair Accessible Picnic Table
  - 1. Provide manufacturer's standard warranty.

- a. Products will be free from defects in components, standard finishes or workmanship for a period of five (5) years from date of manufacture.
- B. Boardwalk Bench
- 1. Provide manufacturer's standard warranty.
    - a. Limited twenty-year warranty against structural failure of steel bench frame, complete steel bench assembly, and cast iron and aluminum bench supports.
    - b. Limited five-year warranty against structural failure of wood slats.
    - c. Limited one-year warranty on any item not specifically discussed above.

## PART 2 - PRODUCTS

### 2.01 WHEELCHAIR ACCESSIBLE PICNIC TABLE

- A. Picnic Table shall be 210 Wheelchair Accessible Cluster Seating, surface mount, ipe wood, 70" length with powdercoat black finish as manufactured by Maglin Site Furniture, 999 18<sup>th</sup> Street, Suite 3000 Denver, CO 80202, Phone: 800-716-5506, Fax: 877-260-9393, Email: [sales@maglin.com](mailto:sales@maglin.com) Website: [www.maglin.com](http://www.maglin.com) or approved equal, and installed as shown on the Drawings. Concrete for any required post footings shall meet the requirements of Section 03300 CAST IN PLACE CONCRETE.

B. Materials:

- 1. Table frame shall be constructed from 3" x 2-3/8" structural I-Beam with mitered corners.
- 2. Surface material shall be 3.5" (actual) Ipe hardwood.
- 3. All fasteners and hardware shall be tamper resistant stainless steel installed per manufacturers instructions and the Construction Documents. Expansion anchors shall be minimum 1/2" x 3-3/4" in size and include tamper resistant head.
- 4. Metal Finish shall be UV resistant powder coat commercial-grade electrocoating, color shall be matte finish black.
- 5. Ipe wood slats shall be finished with penetrating sealers.

### 2.02 LANDSCAPE BOULDERS

- A. All stockpiled boulders shall be reset on site.

1. Reset stockpiled boulders shall be selected by the Landscape Architect from boulders stockpiled on site by the Contractor. Boulders shall be transported from one area on site to another as required.
  2. All existing stockpiled boulders not specifically located shall be scattered on site within the Limit of Work at the direction of the Landscape Architect.
- B. New boulders.
1. Boulders shall be granite with reasonably rounded edges in the opinion of the Landscape Architect. Boulder size shall be 27 cubic foot (approximately 3' x 3' x 3') **minimum**.
  2. Boulder color shall be buff to light grey in color and similarly matched for each location in the project.
  3. New Boulders shall be approved and tagged by Landscape Architect prior to delivery onsite. Boulders shall be transported from one area on site to another as required and directed by Landscape Architect.
  4. Gravel and crushed stone base materials shall conform to Section 02120, EARTH EXCAVATION, BACKFILL, FILL, AND GRADING.

## 2.03 BOARDWALK BENCH

- A. Bench shall be Dumor, inc Model #37-80I - 8' Backless Bench, IPE, S-2 surface mount with powdercoat black finish or approved equal, installed as shown on the Drawings. DuMor Inc. 138 Industrial Circle, Mifflintown, PA 17059, Phone: 800-598-4018, Fax: 717-436-9839, Email: [sales@dumor.com](mailto:sales@dumor.com), Website: [www.dumor.com](http://www.dumor.com)
- B. Powder coating:
1. All parts shall be processed through an 8-stage iron phosphorous wash system.
  2. All parts shall be coated with a zinc-rich epoxy primer to an AVERAGE of 4-5 mils.
  3. Parts shall be finished with top-coat TGIC-polyester powder to an AVERAGE of 4-5 mils.
  4. Powder shall be cured at manufacturers specifications using combination of infrared and convection heat for approximately 20 minutes.
  5. Finished parts shall comply with the following American Standard Test Method (ASTM) for coating and coating method: ASTM-D-523, ASTM-D-3363, ASTM-D-1737, ASTM-D-3359, ASTM-D-2794, ASTM- B-117 and ASTM-D-3451.

- C. All installation hardware shall be stainless steel, tamper resistant and approved by Owner's Representative prior to installation.

### PART 3 - EXECUTION

#### 3.01 WHEELCHAIR ACCESSIBLE PICNIC TABLE

- A. Contractor shall confirm concrete pad has been installed and properly cured prior to commencing placement and installation.
- B. Owner's representative shall approve final location in field.
- C. Install Picnic Table according to manufacturer's installation instructions.
- D. Adequately clean and blow out core drill holes prior to installing fasteners.
- E. Tighten and replace any missing hardware immediately.
- F. Clean any dust or dirt with a soft cloth and mild detergent, abrasive cleaners, brushes and steel wool should NOT be used.
- G. If the finish is marred by a sharp object and the steel is exposed take a fine abrasive material to the area to improve the adhesion of the primer and touch-up paint. A quality grade exterior metal primer and top-coat of matching color enamel should then be applied over the prepared surface.
- H. Protect installed Picnic Table until completion of project.

#### 3.02 TIMBER LOG ELEMENTS (LOG SCRAMBLE, NATURAL LOG AND BOULDER FEATURE, CURVED RUSTIC BENCH AND RUSTIC WOODLAND BENCH)

- A. Timber elements, earth anchors, fasteners and hardware not in contract, to be provided by Artist. Artist to deliver timber elements to the project site.
- B. Contractor shall stake locations of exploration area timber elements for approval by Landscape Architect.
- C. Contractor shall be responsible for preparing subgrade and base materials as shown in the Construction Documents.
- D. Contractor shall transport individual timber elements to approved staked locations as directed by Artist in the field. Earth anchors and fasteners to be provided by and installed by Artist.
- E. Following earth anchor installation and fastening by Artist, Contractor shall backfill material around timber elements to achieve finished grade as indicated on the Construction Documents.

- F. Base materials shall conform to Section 02120, EARTH EXCAVATION, BACKFILL, FILL, AND GRADING.

### 3.03 LANDSCAPE BOULDER

- A. Install boulders as directed by the Owner's Representative in the field and according to the Construction Documents.
- B. The exact location and orientation of each boulder shall be approved in the field by the Owner's Representative prior to final setting.
- C. Extreme care shall be taken during transport and setting to avoid any gauging or scratching damage to the boulder.
- D. All boulders shall be cleaned thoroughly to remove stains, dirt and other discoloration or blemishes.

### 3.04 BOARDWALK BENCH

- A. The Contractor shall be responsible for timing the delivery of site furnishings so as to minimize on-site storage time prior to installation. All stored materials and items must be protected from weather, careless handling and vandalism.
- B. Contractor shall provide all necessary appurtenances to install bench.
- C. No field welding will be permitted.
- D. Bench shall be installed level and plumb.
- E. Bench shall be located and oriented as shown on Drawings.
- F. Bench surface mounting hardware shall be attached to IPE decking at or near the center line of a decking board. 2"x4" pressure treated blocking shall be installed below decking. No hardware shall be placed within 1" of any decking edge.
- G. All hardware and fasteners shall be stainless steel and tamper resistant.

END OF SECTION 02800

## SECTION 02900

### PLANTING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Contract Documents and as specified in this Section and includes, but is not limited to, the following:
1. Planting trees, shrubs and herbaceous plants.
  2. Applying fertilizer and inoculants.
  3. Staking trees.
  4. Installing bark mulch (bioretention basin).
  5. Installing composted leaf mulch.
  6. Planting maintenance for one year following completion.
  7. Providing a one-year guarantee period for all plants.

##### 1.02 RELATED WORK

- A. The following items of related work are specified and included in other Sections of the Specifications:
1. Division 1, GENERAL REQUIREMENTS
  2. Section 01568, EROSION AND SEDIMENT CONTROL
  3. Section 02000, LANDSCAPE MANAGEMENT
  4. Section 02100, SITE PREPARATION
  5. Section 02210, EARTH EXCAVATION, BACKFILL, FILL, AND GRADING
  6. Section 02630, STORMWATER FACILITIES

7. Section 02950, PLANTING SOILS
8. Section 02952, SEEDING AND SODDING

### 1.03 REFERENCES

- A. The following standards shall apply to the work of this Section.
  1. Hortus III, 1976, L. H. Bailey Hortorium.
  2. Tree and Shrub Transplanting Manual, E.B. Himelick, 1991, International Society of Arboriculture.
  3. American National Standards Institute (ANSI):
    - Z60.1 American Standard for Nursery Stock,, latest edition, published by American Association of Nurserymen, (AAN).

### 1.04 SUBMITTALS

- A. Identify nursery source and availability of specified plants within 30 days of the award of contract. Submit to Owner's Representative for approval before ordering material.
- B. At least 30 days prior to the first day of the planting season, submit to the Owner's Representative proof of certification of Foreman or Crew Leader as Massachusetts Certified Landscape Professional or Massachusetts Certified Horticulturist in accordance with QUALITY ASSURANCE paragraph of this Section.
- C. Submit proof of landscape contractor's experience to the Owner's Representative in accordance with QUALITY ASSURANCE paragraph of this Section.
- D. At least 30 days prior to ordering materials, the Contractor shall submit to the Owner's Representative representative samples, certifications, manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner's Representative reserves the right to reject, on or after delivery, any material which does not meet these Specifications.
- E. Material Sampling and Testing:
  1. Material Sampling and Testing of Planting Soils shall be specified, performed and paid for under the work of Section 02950, PLANTING SOILS, of this Specification.
  2. Planting Mulch:
    - a. Submit a one cubic foot sample bark mulch (bioretention basin).
    - b. Submit a one cubic foot sample composted leaf mulch.

3. Antidesiccant: Submit manufacturer's product data.
4. Organic Compost: Submit a one cubic foot sample and manufacturer's certification of contents.
5. Mycorrhizal Fungal Inoculant:
  - a. Submit manufacturer's product data certifying that inoculant being supplied conforms to these Specifications.
  - b. Submit the purchasing receipt showing the total quantity purchased for the Project prior to installation.
  - c. Submit empty packets of fungal spore inoculant to the Owner's Representative for verification of use.

#### 1.05 EXAMINATION OF CONDITIONS

- A. All areas to be planted shall be inspected by the Contractor before starting work and any defects such as incorrect grading or inadequate drainage shall be reported to the Owner's Representative prior to beginning this work.
- B. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to the potential need for storing and maintaining plants temporarily and/or rehandling plants prior to final installation.
- C. All plants are the full responsibility of the Contractor between the time of digging at the nursery and final acceptance.

#### 1.06 QUALITY ASSURANCE

- A. Investigate sources of supply and make assurances that plants will be supplied as indicated in Plant Schedule in sizes, variety and quality noted and specified before submitting bid. Failure to take this precaution will not relieve responsibility for furnishing and installing plant material in accordance with Contract requirements and without additional expense to Owner.
- B. Upon delivery and before planting, Owner's Representative will observe plants. Evaluation and approval by Owner's Representative of plants is for quality, size and variety only and in no way impairs the right of rejection for failure to meet other requirements during progress of work.
- C. Qualification of Landscape Contractor: The work of Section 02900, PLANTING of this Specification shall be performed by a landscape contracting firm which has successfully installed work of a similar quality, schedule requirement, and construction detailing with a minimum of (5) five years experience. Proof of this experience shall be submitted per SUBMITTALS paragraph of this Section 02900, PLANTING.



- D. Qualification of Foreman or Crew Leader: All work of unloading, stockpiling, storing, transporting on-site, planting, fertilizing, and maintenance of trees, shrubs and herbaceous plugs shall be supervised by a foreman or crew leader who is a certified landscape professional or a certified horticulturist.
1. Landscape professional shall be a Massachusetts Certified Landscape Professional certified by the Associated Landscape Contractors of Massachusetts.
  2. Horticulturist shall be a Massachusetts Certified Horticulturist as certified by the Massachusetts Nursery and Landscape Association.
  3. Certification shall be current. Proof of certification shall be submitted per SUBMITTALS paragraph of this Section 02900, PLANTING.
- E. Plant Sources: The Owner's Representative reserves the right to review and reject the source of plant material. The Contractor shall submit for the Owner's Representative's review and approval a list indicating the plant name, size, quantity, and source for the plants. Contractor shall coordinate for
1. The Owner's Representative has endeavored to locate sources for the plant material indicated to determine if materials are available. However, the Owner's Representative makes no claim that the materials will be available at the sources researched. The Contractor shall submit to the Owner's Representative any questions regarding the source of any plant. All reasonable effort should be made to ensure plants are from sources with USDA Zone 5 plant hardiness.
  2. Canopy trees, evergreen trees, understory trees and shrubs may be located from the following sources:
    - a. Pierson Nurseries, Inc.  
24 Buzzell Rd.  
Biddeford, ME 04005  
Tel: 207-499-2994
    - b. Bigelow Nurseries  
455 West Main Street  
Northboro, MA 01532  
Tel: 508-845-2143
    - c. New England Wetland Plants  
820 West Street  
Amherst, MA 01002  
  
Tel: 413-548-4000
  3. Herbaceous Plugs may be located from the following sources:
    - a. New England Wetland Plants  
820 West Street  
Amherst, MA 01002

Tel: 413-548-4000

- b. Pierson Nurseries, Inc.  
24 Buzzell Rd.,  
Biddeford, ME 04005  
Tel: 207-499-2994
- c. Ernst Conservation Seeds  
9006 Mercer Pike  
Meadville, PA  
Tel: 814-336-2404
- d. Vermont Native Plant Supply, LLC  
PO Box 153  
Orwell, VT 05760  
Tel: 802-948-2553

#### 1.07 DELIVERY STORAGE AND HANDLING

- A. Materials Storage and Protection: Store and handle packaged materials in strict compliance with manufacturer's instructions and recommendations. Protect all materials from damage, injury and theft.
- B. Sequencing: Sequence deliveries to avoid delays and minimize on-site storage.
- C. Plant Health: Plants shall be healthy, free of disease and pests, and have sound fibrous root systems. All plants shall be grouped according to species and all groups shall be properly labeled.

### PART 2 - PRODUCTS

#### 2.01 TREES

- A. Species as noted and specified in the PLANT SCHEDULE. **No cultivars shall be used unless otherwise indicated in the PLANT SCHEDULE, or as approved by the Owner's Representative.**
- B. All deciduous trees shall meet the following standards:
  - 1. Trees shall have a single, straight trunk, well formed, and sturdy. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety.
  - 2. Trees with multiple leaders shall conform to all standards noted in this Section for single leader trees and shall be accepted only as noted on the PLANT SCHEDULE.
  - 3. All pruning wounds shall show vigorous bark on all edges at the time of harvest. Trees shall be free from all signs of pest and disease damage. The trunk shall be free from sun

scald, frost cracks, and wounds resulting from abrasions, fire, animal damage, or other causes.

4. Pruning scars within the crown of any tree shall be clean cut and shall leave no protrusion beyond the branch collar.
5. All trees shall have healthy, vigorous leaves of normal size, color, shape, and texture for the particular species and variety.
6. Deciduous shade trees and deciduous flowering trees shall have fall color typical for their species and variety.
7. Unless otherwise indicated on the PLANT SCHEDULE, the height and spread of deciduous shade trees shall be the minimum requirements.
8. Take caliper measurements for deciduous trees 6 inches above ground level up to and including 4 inches caliper size and 12 inches above ground for larger sizes.
9. No deciduous tree shall be pruned after the Owner's Representative has tagged the plant in the nursery except as directed by the Owner's Representative.
10. Unless otherwise noted on the PLANT SCHEDULE, **shade trees for use adjacent to paved areas shall have no branches lower than 6.5 feet from finish grade.** Flowering trees for use in areas away from pedestrian traffic shall have the first branch of their crowns no higher than 4 feet from finish grade.
11. Branching of all deciduous trees shall be best quality representatives of the species, cultivar or variety with lateral branching around the entire trunk to form a symmetrical tree for 80 percent to 100 percent of the tree's outer perimeter. All branches on deciduous trees shall meet the trunk at angles no less than 30 degrees and no greater than 90 degrees from the vertical.

## 2.02 SHRUBS

- A. Species as noted and specified in the PLANT SCHEDULE. **No cultivars shall be used unless otherwise indicated in the PLANT SCHEDULE, or as approved by the Owner's Representative.**
- B. All shrubs shall meet the following standards
  1. All shrubs shall be healthy and vigorous plants which are very well shaped, heavily branched, densely foliated, and true to form for the variety.
  2. Canes or Trunk(s) and Branches:
    - a. Well formed and sturdy.

- b. Branching shall be uniformly distributed close to the ground.
  - c. Scars shall be free of rot and not exceed 1/4 the diameter of the wood beneath in greatest dimension unless completely healed (except pruning scars).
  - d. Pruning scars shall be clean cut and shall leave little or no protrusion from the trunk or branch.
  - e. Graft unions shall be completely healed.
  - f. No suckers or water sprouts.
  - g. Contain no dead wood.
  - h. Free of cracks, splits, or cambium peeling.
3. No shrub with pest or mechanical damage will be accepted.
4. Shrubs shall show no signs of frost or winter damage to the foliage. Foliage shall not be in a state of drought stress. Leaves or needles shall show no signs of wilt or desiccation due to weather stress at any season of the year.

2.03 HERBACEOUS CONTAINERIZED PLANTS AND PLUGS

- A. Species as noted and specified in the PLANT SCHEDULE. **No cultivars shall be used unless otherwise indicated in the PLANT SCHEDULE, or as approved by the Owner's Representative.**
- B. All herbaceous containerized plants and plugs shall meet the following standards:
  - 1. Shall be healthy and well cared for, with no evidence of insects or diseases present. Insect-ridden or diseased plants shall be rejected. Plants shall have a deep green foliage and dense, compact growth.

2.04 GRADES AND STANDARDS OF PLANTS

- A. The Contractor shall furnish all plants shown on the Contract Documents, as specified, and in quantities listed on the PLANT SCHEDULE. No substitutions will be permitted, without written approval by the Owner's Representative. All plants shall be nursery grown unless specifically authorized to be collected as noted on the PLANT SCHEDULE.
- B. All plants shall be typical of their species or variety and shall have a normal habit of growth and be legibly tagged with the proper name. Only plant stock grown within

Hardiness Zones 1 through 6b, as established by the USDA Plant Hardiness Zone Map, latest edition, will be accepted.

- C. Plants shall be in accordance with ASNS Standards of the American Association of Nurserymen except as noted in this Section. Botanical plant names shall be in accordance with plant designations included in Hortus III.

Plants Sized by Height or Spread

Plants Sized by Caliper

8 feet	6-1/2 inch
9 feet	7 inch
10 feet	7-1/2 inch
12 feet	8 inch
14 feet	8-1/2 inch
16 feet	9 inch
18 feet	9-1/2 inch
20 feet	10 inch

- D. If, at any time during the performance of the Contract, any plant shows signs of graft incompatibility, as determined by the Owner's Representative, then the tree or shrub and all other similarly grafted plants of the same Genus/Species/Variety shall be rejected and removed from the site. Visual symptoms of graft incompatibility as cause for rejection include:
1. Development of over-growths by rootstock or scion resulting in the development of shoulders or inverted shoulders.
  2. Suckering of the rootstock combined with poor growth or dieback of scion.
  3. Any mechanical weakness between scion and rootstock.
  4. Any marked difference in bark pattern and structure between scion and rootstock.

2.05 ROOT SYSTEMS FOR ALL PLANTS

- A. Each plant shall have an extensive, symmetrically balanced fibrous root system. Any root ball which shows signs of asymmetry, injury, or damage to the root system shall be rejected.
- B. Curling or spiraling of the roots along the walls of rigid containers will not be accepted.
- C. All parts of the fibrous root system of all plants shall be moist and fresh with a white color when washed of soil. When the plant is removed from the container, the visible root mass shall be healthy with white root tips. The root systems of all plants shall be free of disease, insect pests, eggs, or larvae.

- D. All trees and all shrubs which are not grown in containers must be moved with the root systems as solid units with balls of earth firmly wrapped with untreated 8 ounce natural, biodegradable fabric burlap, firmly laced with stout, natural biodegradable cord or twine. The base of the tree trunks shall be wrapped with a protective burlap layer, surrounded by a cardboard trunk protector, and loosely tied with twine.
- E. The diameter and depth of the balls of earth must encompass the fibrous and root feeding system necessary for the healthy recovery of the plant. Minimum root ball diameters and depths shall be in accordance with ASNS standards.
- F. No plants shall be loose in the container.
- G. Container grown plants which have roots growing out of the container will be rejected.

## 2.06 COMPREHENSIVE SOIL INOCULANT

- A. The comprehensive soil inoculant shall contain a combination of mycorrhizal fungi, beneficial rhizosphere bacteria, hydrogels, humic acids, and various microbial nutrients. Each packet shall contain a dry, water-soluble granular material and shall consist of the following:
  - 1. Live spores of VA Endomycorrhizal fungi: Vesicular-Arbuscular mycorrhizae (VAM) fungi, minimum of four (4) species.
  - 2. Live spores of Ectomycorrhizal fungi, including *Pisolithus tinctorius*.
- C. Biostimulant shall contain beneficial rhizosphere bacteria (*Bacillus licheniformis*, *Bacillus megaterium*, *Bacillus polymyxa*, *Bacillus subtilis*, *Bacillus thuringiensis*, *Paenibacillus azotofixans*), humic acids, microbial nutrients (maltodextrin, seaweed, and yeast extracts) and inert ingredients.
- D. Comprehensive Soil Inoculant shall be:
  - 1. PHC Tree Saver Transplant, as manufactured by Lebanon Seaboard Corporation, [www.LebanonTurf.com](http://www.LebanonTurf.com).
  - 2. Diehard Transplant, as manufactured by Horticultural Alliance, Inc., [www.horticulturalalliance.com](http://www.horticulturalalliance.com).
  - 3. WSM (Water Soluble Mycorrhizae), as manufactured by ENP Investments, [www.enpturf.com](http://www.enpturf.com).

## 2.07 FERTILIZER

- A. Spring Planting: Slow-release fertilizer shall be the 16-11-10 controlled, slow-release

fertilizer packets (8-9 month), as manufactured by Osmocote Pro, or approved equal.

- B. Fall Planting: Quick-release fertilizer shall be Start 6W 12-11-17 fertilizer packets (6 week), as manufactured by Osmocote, or approved equal.

## 2.08 PLANTING SOIL MIX

- A. Planting soil mix shall be an approved planting soil specified, provided, installed and paid for under the Section 02950, PLANTING SOILS, and that has been pH adjusted according to particular planting applications and improved through the addition of organic matter as directed below. Planting soil shall conform to the following pH levels:
  - 1. For broad-leaved evergreens and plants of the Heath Family, Ericaceae, requiring an acid soil, planting soil mix shall have a true pH of 4.5 to 5.5. Planting soil mix shall be amended by the Contractor at his own expense to the proper pH range by mixing with sulfur as specified, provided, installed and paid for under the Division 2 Section, PLANTING SOILS, of this Specification. Plants belonging to the Heath Family include but are not limited to the following genuses: Arctostaphylos, Calluna, Chamaedaphne, Enkianthus, Epigaea, Erica, Gaultheria, Gaylussacia, Kalmia, Oxydendron, Pieris, Rhododendron, Vaccinium, and Zenobia.
  - 2. Planting soil mix for general planting of non-acid loving plants shall have a true pH value of 6.0 to 6.5. Planting soil mix shall be amended by the Contractor at his own expense to the proper pH range by mixing with dolomitic limestone as specified, provided, installed and paid for under the Section 02950, PLANTING SOILS.
  - 3. The amount of either sulfur or limestone required to adjust the planting soil mix to the proper pH range shall be approved by the Owner's Representative on the basis of soil tests as specified, provided, installed and paid for under the Section 02950, PLANTING SOILS, of this Specification.

## 2.09 SOIL ADDITIVES

- A. Soil additives shall be specified, provided, installed and paid for under Section 02950, PLANTING SOILS.

## 2.10 MULCH

- A. Bark Mulch: Mulch shall be high quality, double-ground, premium bark mulch of 70 percent hemlock bark with the balance spruce and pine bark. Mulch shall have been aged for a minimum of six months and not longer than two years. Bark mulch shall be shredded to a uniform size; free of dirt, debris and foreign matter; with pieces no thicker than 1/4 in. Mulch must be free of stringy material or chunks over 2 inches in size and

shall not contain, in the judgment of the Owner's Representative, an excess of fine particles. Submit sample for the Owner's Representative's approval.

- B. Composted Leaf Mulch: Leaf mulch shall be a highly organic dark brown to black spongy residue resulting from the well aerated composting of deciduous tree parts, free of plants and their roots, debris, or other extraneous matter and shall be uncontaminated by foreign matter, invasive species and substances harmful to plant growth. The organic matter shall not be less than 85 percent by weight.

## 2.11 WATER

- A. The Contractor shall be responsible to furnish his own supply of water to the site at no extra cost. If possible, the Owner shall furnish the Contractor upon request with an adequate source and supply of water at no charge. However, if the Owner's water supply is not available or not functioning, the Contractor shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

## 2.12 ANTIDESICCANTS

- A. Antidesiccants shall be emulsions or other materials which will provide a protective film over plant surfaces permeable enough to permit transpiration and specifically manufactured for that purpose. Manufacturer of antidesiccant shall be subject to the Owner's Representative's approval and shall be used only after approval by the Owner's Representative. Antidesiccant shall be delivered in containers of the manufacturer and shall be mixed and applied according to the manufacturer's instructions.

## PART 3 - EXECUTION

### 3.01 PLANTING

- A. Furnishing and planting of plant material shall include, but shall not be limited to, the digging of planting pits and plant beds, amendment of loam as required to produce planting soil mix, provision of soil additives required to adjust for pH requirements of specific plants, furnishing the plants as specified as well as the labor of planting, fertilizing, and maintenance.
- B. Prior to spreading of planting soil, subgrades shall have been tested to determine if they are too compact to drain water as specified, performed and paid for under the work of Section 02100, SITE PREPARATION, of this Specification.
- C. The Contractor shall locate plant material sources and ensure that plants are shipped in timely fashion for installation.



Seasons for Planting:

1. Spring: Deciduous materials – April 1 through June 30; Evergreen materials - April 15 through June 1.
2. Fall: Deciduous materials - October 1 through December 1; Evergreen materials - August 15 through October 15.

D. Plant Material Inspection:

1. A maximum of **one (1) month** after the contract is awarded, the Contractor shall request that the Owner's Representative provide a representative to select and tag stock to be planted under this Section 02900, PLANTING:
  - a. For trees and shrubs, the Owner's Representative shall provide a representative to select and tag stock to be planted under this Section 02900, PLANTING at the nursery.
  - b. The Contractor shall pay for the transportation, subsistence and overnight accommodations, if necessary, for the Owner's Representative's representative during the period of time required to select and tag the plant material.
2. The Contractor shall be responsible to certify the availability of quality plants in specified sizes from his/her sources of supply prior to requesting that the Owner's Representative make plant source inspections. In the event that plants at the inspection location are found to be unavailable or of insufficient size, the Contractor shall be liable to reimburse the Owner for all costs of the Owner's Representative's hourly services that are incurred during unproductive inspection trips.
3. Unless specifically designated otherwise, a representative of the Contractor shall accompany the Owner's Representative on all plant material selection field trips.
4. All trees for the project shall be individually tagged for approval with the Owner's Representative's seals, and no trees shall be accepted for delivery to the site without such seals. Representative samples only of shrubs and containerized herbaceous plants may be tagged or marked for approval as an "Approved Typical Sample". Any shrub or containerized plant that arrives at the construction site that does not meet the Approved Typical Sample will be rejected by the Owner's Representative.
5. Inspection and approval of plants at the source shall not impair the right of subsequent inspection and rejection upon delivery to the site, or during the progress of the work if the Owner's Representative finds that plants do not meet the requirements of the PLANT SCHEDULE or this Contract, have declined noticeably due to handling abuse, lack of maintenance, or other causes. Cost of replacements, as required, shall be borne by the Contractor.

- E. Placement of planting soil shall be specified, performed and paid for under the work of Section 02950, PLANTING SOILS, of this Specification. Obtain Owner's Representatives written approval of work of rough grading and finish grading prior to starting the work of planting.
- F. Planting:
1. Notify the Owner's Representative **three (3) working days prior** to the proposed arrival of plant material on the site. If not planted within 24 hours of delivery to the site, all plants shall be maintained in an on-site nursery. Container grown shrubs and plugs stored on site shall be shaded from direct sunlight at all times and shall not be stored directly on paved surfaces. All trees and shrubs delivered to the site and not planted within 24 hours of delivery shall have their root balls covered with mulch and shall be watered on a daily basis such that root balls are kept moist throughout. All containerized plants delivered to the site and not planted within 24 hours of delivery shall be watered on a daily basis such that planting media is kept moist throughout.
  2. Locations for all plants and outlines for planting areas shall be staked on the ground by the Contractor for approval by the Owner's Representative before any plant pits or plant beds are dug. Notify the Owner's Representative no less than 3 days prior to desired date of inspection of staking to schedule site visit.
  3. All plant pits dug with a machine shall have the sides of the holes scraped with a hand shovel or metal cultivator to prevent glazing or compaction of the sides of the hole. Remove and stockpile excavated loam for reuse as backfill for plant pit. All subsoil excavated from the bottoms of planting pits shall be removed from the site.
  4. Plant pits shall be dug to the dimensions shown on the Contract Documents.
    - a. Plant pits for trees shall be a minimum 6 feet greater in diameter than the diameter of the root ball. Place root ball directly on subgrade. Slope sides of tree pits at a 45 degree angle.
    - b. Plant pits for shrubs shall be 2 feet greater in diameter than the diameter of the root ball. Place root ball directly on subgrade. Slope sides of tree pits at a 45 degree angle.
    - c. Shrub planting beds shall be excavated and backfilled with planting soil mix to a minimum uniform depth of 24 inches below final grade, or as shown on the Contract Documents.
    - d. Plant pits shall be dug to the depth of the rootball to be planted. Remove all soil from around the root flare of the stem of the plant and from the top of the rootball to determine the true depth of the rootball. All plants that have been planted and have root flares that are buried will be rejected.

5. All plant roots and earth balls must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation, and at the site until the final planting.
6. Remove container plants from containers prior to planting.
7. Trees and shrubs shall be placed in the center of plant pits, plumb, with the crown of their roots exposed and located above the surrounding finish grade.
8. Prior to completion of planting installations, remove rope and cut wire baskets from the top 1/3 of the root balls. Pull burlap away from the trunk or stem of the plant and cut burlap from the top 1/3 of the root balls.
9. Backfill stockpiled subsoil into the bottom of the planting pit to stabilize rootball prior to backfilling with stockpiled loam. Subsoil shall be wedged under the curve of the rootball sufficiently to support the rootball and to keep the trunk of the tree plumb during planting soil placement. Under no circumstances shall depth of backfilled subsoil be such that the remaining volume left for backfilling the planting soil is less than 18 inches. Compact subsoil by foot tamping prior to placing loam backfill.
10. Planting soil shall be backfilled in layers of not more than 6 inches. Compact each layer of planting soil by foot tamping prior to placing next layer of planting soil backfill. Eliminate all air pockets in the backfill material. Enough planting soil shall be used to bring the finished surface of the planting pit to 2 inches above finished grade at plant stem when backfill soil has settled. A saucer shall be formed around each plant at a depth of 6 inches for trees and 4 inches for shrubs.
11. All topsoil excavated from the planting pit shall be modified in accordance with the requirements of this specification and used to backfill the pit.
12. Planting soil shall be backfilled in layers of not more than 6 inches. Compact each layer of planting soil by foot tamping prior to placing next layer of planting soil backfill. Eliminate all air pockets in the backfill material. Enough planting soil shall be used to bring the finished surface of the planting pit to 2 inches above finished grade at plant stem when planting soil backfill has settled. A saucer shall be formed around each plant at a depth of 6 inches for trees and 4 inches for shrubs.
13. Fertilizer shall be spread over the plant saucer or plant bed between the saucer and the edge of the rootball. Till the fertilizer into the soil to a depth of four inches prior to the placement of the planting mulch. Fertilizer shall be provided, spread and paid for under this Section. Do not mulch until placement of the fertilizer has been verified by the Owner's Representative. Fertilizer application rates shall be as determined by soil testing, analysis, and testing laboratory recommendations specified, performed and paid for under this Section.
14. All plants shall be inoculated with mycorrhizal fungi. Inoculant shall be added after

the plants have been placed in their holes. Open the required number of packets for each plant and thoroughly mix the inoculant powder into the upper 10 inches of backfill soil.

- a. Mycorrhizal fungal inoculant shall be added to the plant pits according to plant size.
- b. The application rates for mycorrhizal fungal packets shall be in accordance with the manufacturer's recommendations.
- c. Submit the purchasing receipt showing the total quantity purchased for the project prior to installation. Submit empty packets of fungal spore inoculant to the Owner's Representative for verification of use. Owner's Representative will excavate tree pits to determine presence of mycorrhizal fungal inoculant.

15. Containerized Planting:

- a. Containerized Planting shall be installed as detailed in the Contract Drawings.
  1. Plant pits shall be 2 feet greater diameter than container diameter. Place container directly on subgrade. Slope sides of pits at 45 degree angle.
  2. Plant pits shall be dug to the depth of the container to be planted. Remove all soil from around the root flare of the stem of the plant and from the top of the container to determine the true depth of the rootmass. All plants that have been planted and have root flares that are buried will be rejected.

16. Herbaceous Plug Planting:

- a. Herbaceous plug plants shall be installed as detailed in the Contract Drawings.
  1. For plugs planted in the Erosion Control Matting, cut a hole in the ECM large enough to allow sufficient room for installation of plugs.
  2. Inoculate and fertilize plants and plugs as identified in previous sections.
  3. Install plugs to appropriate depth to ensure soil surface contact with the entire root surface.
  4. Bark Mulch shall be placed over entire bioretention basin floor to a depth of two (2") inches after settlement, immediately following plug planting. Do not apply mulch prior to the first watering of plug plant materials. Do not apply mulch prior to placement of specified fertilizers. Contractor shall request approval from Owner's Representative prior to mulch placement.

- G. All plants shall be watered immediately following planting as necessary to thoroughly moisten rootball and plant pit loam and thereafter shall be inspected frequently for

watering needs and watered, as required, to provide adequate moisture in the planting pit. The Contractor shall inspect tree pits 24 hours after initial watering to confirm that they are draining properly. If surface water or excessively saturated plant pit soils exist, the Contractor shall immediately notify the Owner's Representative. The Owner's Representative will recommend remedial measures based upon site conditions.

H. Keeping Trees Plumb:

1. Contractor shall keep trees plumb and upright at all times. To this end the Contractor shall stake trees or monitor plants on a regular basis and, if a tree is moved out of plumb, then straighten the tree to a vertical, upright condition.
2. If Contractor chooses to keep trees plumb and upright by staking, guying, or anchoring, then the work of this item shall be performed at the time of planting, unless otherwise approved or directed by the Owner's Representative. Stakes shall be of even height, plumb and neat in appearance and they shall not injure plant balls. Anchoring devices shall be applied as follows:
  - a. Soft steel guy wires shall be double stranded and secured to each stake with a central tightening loop. Thread wires through reinforced rubber hose at tree trunk.
  - b. Drive anchors shall be installed in accordance with manufacturer's instructions.
  - c. Diagonal cables shall receive one flag per cable to promote visibility and prevent tripping hazards.
  - d. Elastic webbing, belting or tape shall be installed in accordance with manufacturer's instructions.
3. If Contractor chooses to keep trees plumb and upright by resetting trees that move out of vertical alignment, then the work of this item shall include:
  - a. Tree inspections on a weekly basis and after storms or abnormally windy days to determine if the trees have shifted out of vertical alignment and require resetting.
  - b. Reset trees that have moved out of plumb by carefully excavating the soil from the base of the rootball facing away from the direction of tilt and easing the tree upright into a vertical, plump position. Upon righting the tree, firmly press the soil around the base of the rootball to reset the tree.
  - c. Mulch and water the tree in accordance with the requirements of this Section 02900, PLANTING, immediately after the work of resetting.

- I. Composted Leaf Mulch material shall be placed over entire saucer areas of individual trees and shrubs and over the entire area of planting beds to a depth of two (2") inches after settlement, not later than one week after planting. Do not apply mulch prior to the first watering of plant materials. Do not apply mulch prior to placement of surface applied fertilizer and verification of placement by the Owner's Representative.
- J. Trees delivered to the site wrapped for protection shall be unwrapped at the site for inspection of the trunk by the Contractor and Owner's Representative.
- K. Pruning:
  - 1. As directed by the Owner's Representative, each plant shall be pruned in accordance with the workmanship requirements of "Pruning Standards" for Class I, fine pruning, to preserve the natural character of the plant.
  - 2. Tree pruning, as required, shall be undertaken to the full height of affected trees.
  - 3. All dead wood or suckers and all broken or badly bruised branches shall be removed. Never cut a leader.
- L. Antidesiccant shall be applied to all evergreen and broadleaf evergreen plants in December and again in February, according to manufacturer's application recommendations and as directed by the Owner's Representative.
- M. If planting is done after seeding preparation or installation, proper protection of seeded areas shall be provided. Any damage resulting from planting operations shall be repaired immediately at no cost to the Owner. Repair work shall be as specified and installed under the work of Section 02952, SEEDING AND SODDING, of this Specification and paid for under this Section 02900, PLANTING.
- N. In the event that rock or underground construction work or obstructions are encountered in any plant pit or bed excavation work, alternate locations will be selected by the Owner's Representative. Relocation of plant pits or beds shall be provided at no additional cost to the Owner. Provide the Owner's Representative with no less than 48 hours notice of obstruction so that a site visit can be scheduled to establish new locations for plants.
- O. Absolutely no debris may be left on the site. Repair any damage to site as directed by the Owner's Representative, at no additional cost.

## 2.02

### MAINTENANCE

- A. Maintenance shall begin immediately after each plant is planted and shall continue for a minimum 30-day Monitoring Period and for (12) months following Final Acceptance.
- B. Maintenance shall consist of keeping the plants in a healthy growing condition and shall include but is not limited to watering, weeding, cultivating, pruning, re-mulching,

straightening of trees to a plumb position, removal of dead material, resetting plants to proper grades or upright position, and maintaining the planting saucer.

1. Plants shall be inspected for watering needs at least twice each week and watered to promote plant growth and vitality. The following watering rates assume that the soil is free draining. If the on-site conditions do not ensure a free draining soil, then notify the Owner's Representative in writing of this condition. Watering rates for trees, shrubs, and live stakes in free draining soils are presented here as guidelines to ensure that the top six inches of plant bed soil remains moist at all times. Actual watering rates may vary depending upon soil conditions. Guideline rates shall be as follows:

<u>Type of Plant/Size</u>	<u>Weekly Watering Rate</u>
Deciduous Trees:	
1 - 1-1/2 in. caliper	40 gallons
1-1/2 - 2 in. caliper	54 gallons
2 - 2-1/2 in. caliper	61 gallons
2-1/2 - 3 in. caliper	70 gallons
3 - 3-1/2 in. caliper	80 gallons

<u>Type of Plant/Size</u>	<u>Weekly Watering Rate</u>
Evergreen Trees:	
5 - 6 ft. height	40 gallons
6 - 7 ft. height	45 gallons
7 - 8 ft. height	50 gallons
8 - 9 ft. height	60 gallons

Shrubs:	
Up to 2 ft. height	10 gallons
2 - 4 ft. height	20 gallons

- a. Water shall be applied by 1-inch diameter hose with an attached metering gauge.
2. For trees in lawn or mulched beds, apply water to the ground surface directly under the canopy. Water shall be applied at a sufficiently slow rate to prevent run off from the soil surface but great enough to equal 0.2 inches of water per square foot of canopy area per hour for 5 hours per week.
  3. Planting beds and individual plant pits shall be kept free of weeds, and mulch shall be replaced as required to maintain the specified layer of mulch. Beds and individual pits shall be neat in appearance and maintained to the designed layout.
  4. Plants that die during the maintenance period shall be removed and replaced by the Contractor within one week of notification and replaced during that growing season, unless directed otherwise by the Owner's Representative.

5. Spraying of insecticides or herbicides shall be done by State-licensed professionals. Spraying for insects, pests and diseases shall conform to the National Arborist Association Standards under the section entitled "Standards for Pesticide Application Operations", as currently adopted and as approved by the Owner's Representative. All insecticides, pesticides, and herbicides shall be EPA-approved and shall conform to the requirements MCRG: Massachusetts Control Recommendation Guide for Insect, Disease, and Weed Pests of Shade Trees and Woody Ornamentals, latest edition, University of Massachusetts, Amherst, College of Food and Natural Resources.
  6. Work of pruning, fertilizing, spraying, and similar activities shall be undertaken only by Certified Arborists and licensed chemical applicators, as pertinent to the work being performed.
- C. During the maintenance period, any decline in the condition of plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturalists to inspect plant materials and to identify problems and recommend corrective procedures. The Owner's Representative shall be immediately advised of such actions. Inspection and recommendation reports shall be submitted to the Owner's Representative.

#### 3.04 ACCEPTANCE

- A. Upon completion of all planting work, the Contractor shall request in writing that the Owner's Representative formally inspect the planting work.
- B. If plant materials and workmanship are acceptable, the Owner's Representative will issue a written Certificate of Conditional Acceptance to the Contractor.
- C. Following the issuance of the Certificate of Conditional Acceptance to the Contractor, the Contractor shall maintain the plants for a minimum 30 day Monitoring Period. At the end of the Monitoring Period, the plant material will be inspected by the Owner's Representative to determine whether or not all planting work has been performed to the requirements of this Section 02900, PLANTING.
- D. Acceptance Standards at end of the Monitoring Period: If plant material is reviewed when it is in full leaf, leaves shall be plump with water with a shape indicative of the species and shall be free of insect, pest and disease damage. Twigs shall have living cambium for their full length. Twigs and branches shall have a full bud set for their full length, including terminal buds. Trunks and branches shall be free of frost cracks; sun scald; damage due to insects, pests, and disease; structural defects; and damage resulting from machinery or tools. Plant material inspected and reviewed when the plants are not in full leaf shall have twigs, branches and trunks meeting the above requirements. All plants regardless of the season of review shall have a minimum of 75 percent healthy, balanced branching structure with a healthy terminal leader(s) with viable terminal bud(s).



- E. If any number of plants do not meet these Acceptance Standards at the time of inspection, or if in the Owner's Representative's opinion, workmanship is unacceptable, written notice will be given by the Owner's Representative to the Contractor in the form of a punch list, which itemizes necessary planting replacements and/or other deficiencies to be remedied. The Contractor's responsibility for maintenance of all plants shall be extended until replacements are made or other deficiencies are corrected. All plants that do not meet these Acceptance Standards shall be removed from the project within seven days of receipt of the punch list. Replacements shall conform in all respects to the Specifications for new plants and shall be planted in the same manner
- F. Following the correction of all Punch List deficiencies, the Contractor shall request in writing that the Owner's Representative formally inspect the planting work. If plant materials and workmanship are acceptable, the Owner's Representative will issue a written Certificate of Final Acceptance to the Contractor.

### 3.05 GUARANTEE

- A. The date of the Certificate of Final Acceptance shall establish the commencement of the required one (1) year guarantee and establishment period for planting work.
- B. When the work is accepted in part, the guarantee period shall extend from each partial acceptance to the terminal date of the last guarantee period. All guarantee periods terminate at one time.
- C. Plants shall be healthy, free of pests and disease. Plants shall exhibit vigorous growth, shall bear foliage on normal density, size and color, and shall have no less than seventy-five percent (75%) of their branches alive at the end of the guarantee period. If the leader of any single-leader species is dead, the entire plant shall be considered dead.
- D. Any plant required under this Contract that is dead or unsatisfactory, as determined by the Owner's Representative, shall be removed from the site. These shall be replaced as soon as weather permits during the specified planting season, at no additional cost to the Owner, until the plants live through one year.
- E. All replacements shall be plants of the same kind and size specified in the PLANT SCHEDULE. The cost shall be borne by the Contractor, except for possible replacements due to vandalism or neglect on the part of others.
- F. The guarantee of all replacement plants shall extend for an additional one-year period from the date of their acceptance as replacement.
- G. Guarantee shall not apply to the replacement of unacceptable plants resulting from the removal, loss, or damage due to occupancy of the project in any part; vandalism or acts of neglect on the part of others; physical damage by animals, vehicles, etc.; and Acts of God, including but not limited to, catastrophic fire, hurricanes, riots, war, etc.

- H. At the end of the guarantee and establishment period, a final inspection will be held to determine whether any plant material replacements are required. Each plant shall be plumb, shall have a character that is natural for its species as determined by the Owner's Representative, and shall conform to the Acceptance Standards described in this Section 02900, PLANTING. Plants found to be unacceptable shall be removed promptly from the site and replaced according to this Section 02900, PLANTING. A final inspection will be made after the replacement plants have lived through one full year.
- I. All replacements shall be plants of the same kind and size specified in the PLANT SCHEDULE. The cost shall be borne by the Contractor, except for possible replacements due to vandalism or neglect on the part of others.

END OF SECTION 02954

## SECTION 02950

### PLANTING SOILS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. The General Documents, as listed on the Table of Contents, and applicable parts of Division 1, GENERAL REQUIREMENTS, shall be included in and made a part of this Section.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

#### 1.02 SUMMARY

- A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to sample, amend, supply and place planting soils as indicated on the Contract Documents and specifications and shall include but not be limited to the following:
  - 1. Sampling and testing of stockpiled topsoil (existing).
  - 2. Testing of subgrade infiltration.
  - 3. Manufacturing of Planting Soil, and Bioretention Basin Soil as necessary, to meet project requirements.
  - 4. Sampling, testing, amending, screening, placing, spreading and fine grading of planting soils as required by this Section 02950, PLANTING SOILS.
  - 5. Hiring an independent soil-testing firm at the Contractor's expense to verify compliance with these Specifications.

#### 1.03 RELATED WORK

- A. The following items of related work are specified and included in other Sections of the Specifications:
  - 1. Section 01568, EROSION AND SEDIMENT CONTROL
  - 2. Section 02100, SITE PREPARATION
  - 3. Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING
  - 4. Section 02900, PLANTING
  - 5. Section 02952, SEEDING AND SODDING
  - 6. Section 02630, STORMWATER FACILITIES

#### 1.04 REFERENCES

- A. ASTM: American Society for Testing and Materials  
D 2977, Standard Test Method for Particle Size Range of Peat Materials and Horticultural Practices
- B. US EPA: United States Environmental Protection Agency  
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. SW-846. 3<sup>rd</sup> Edition.
- C. TMECC: Test Methods for the Examination of Compost and Composting Sampling and Test Methods  
Jointly published by the USDA and USCC (2002 publishing as part of the USDA National Resource Conservation Technical Bulletin Series)
- D. US Composting Council Seal of Testing Assurance Program Documents

#### 1.05 SAMPLING, TESTING, AND SUBMITTALS

- A. At least **30 days prior to ordering materials**, the Contractor shall submit to the Owner's Representative samples, certifications, manufacturer's product data and certified test results for materials as specified below for approval. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner's Representative reserves the right to reject, on or after delivery, any material that does not meet these Specifications. All reports must be from recent analyses, less than 90 days old, and represent materials that are available for delivery to the site.

Submit the following in accordance with Section 01300, SUBMITTALS:

1. Existing Topsoil: Sample and test the stockpiled soils. The Contractor shall sample the soils of the construction site in the following manner:
  - A. The Contractor shall provide **one cubic foot representative sample per each 100 cubic yard on-site stockpile of existing topsoil** for testing. All stockpile sampling shall be per ASTM D 75 and Appendixes for securing samples from stockpiles.
  - B. Stockpiles shall be as described in Section 02120, EARTH, EXCAVATION BACKFILL, FILL AND GRADING and labeled in the field with a numbering system referenced in all soil samples and test results.

- C. Preparation of Samples: Contractor shall take one cup of soil from each representative sample and dry it at room temperature (do not dry samples in an oven or on a stove or radiator). Once soil is dry, place soil in sandwich size zip-type plastic bag and close it tightly. Label each sample on outside of bag, identifying sample by reference number. Provide an approved site plan showing locations of stockpiles cross-referenced to soil samples and test results.
2. Common fill and topsoil: Sample and test the proposed soils. Testing for proposed materials shall be at the Contractor's expense. The Contractor shall sample the soils of the construction site in the following manner:
    - a. Preparation of Samples: Contractor shall take one cup of soil from each representative sample and dry it at room temperature (do not dry samples in an oven or on a stove or radiator). Once soil is dry, place soil in sandwich size zip-type plastic bag and close it tightly. Label each sample on outside of bag, identifying sample by reference number.
- B. Contractor shall deliver all samples to testing laboratories via overnight courier and shall have the testing report sent directly to the Owner's Representative. Perform all tests for gradation, organic content, soil chemistry and pH by UMASS Soil and Plant Tissue Laboratory, West Experiment Station, North Pleasant Street, University of Massachusetts, Amherst, MA 01003, (413) 545-2311, or another professional testing laboratory approved by the Owner's Representative. Testing reports shall include the following tests and recommendations. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the Owner's Representative from the Soil and Plant Tissue Laboratory. Testing reports shall include the following tests and recommendations.
1. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System. Sieve analysis shall be by combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM D 422 after destruction of organic matter by H<sub>2</sub>O<sub>2</sub>. To facilitate review and approval of sieve analysis, provide a computer generated gradation curve from UMASS Soil & Plant Tissue Laboratory.
  2. Percent of organics shall be determined by the loss on ignition of oven-dried samples. Test samples minus #10 material shall be oven-dried to a constant weight at a temperature of 450 degrees Fahrenheit.
  3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, extractable Aluminum, Lead, Zinc, Cadmium, Copper, Soluble Salts, pH, and buffer pH. A Conductivity Meter shall be used to measure Soluble Salts in 1:2 soil/water (v/v). Except where otherwise

noted, nutrient tests shall be for available nutrients.

4. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary to accomplish planting work as specified.
  5. Leaf Mulch: Submit a one cubic foot sample and supplier's certification of contents.
  6. Limestone: Submit manufacturer's product data.
  7. Acidulant: Submit supplier's certification that the acidulant being supplied conforms to these Specifications.
  8. Gypsum: Submit manufacturer's product data and one (1) pound sample.
  9. All additives needed to amend the existing soils in order to meet these specifications.
- C. Samples: Prior to ordering the below listed materials, submit representative composite samples to the Owner's Representative for selection and approval. Representative composite samples shall be composed of at least five equal-sized subsamples mixed thoroughly and resampled for submittal. Do not order materials until acceptance from Owner's Representative has been obtained. Delivered materials shall closely match the approved samples.
1. Components
    - a. Compost: duplicate samples of 1 gallon.
    - b. Base Loam: duplicate samples of 1 gallon.
    - c. Medium to Coarse Sand: duplicate samples 1 gallon.
    - d. Stripped and Stockpiled Topsoil
  2. Test Blends
    - a. Planting Soil: duplicate samples of 1 gallon.
    - b. Bioretention Basin Soil
- D. Sources for Base Loam, Sand, and Compost: Submit information identifying sources for all soil components and the firm responsible for mixing of planting soil mixes.
1. Owner's Representative shall have the right to reject any soil supplier or mixing facility.
  2. Soil mix supplier shall have a minimum of five years experience at supplying custom

planting soil mixes.

3. Submit supplier name, address, telephone and fax numbers and contact name.
4. Submit certification that accepted supplier/ mixer is able to provide sufficient quantities and qualities of materials for the entire project.
5. Final approval of soil supplier/ mixer shall be made after on-site review of supplier's and mixer's facility(ies) by the Owner's Representative.
6. The following Soil Suppliers may provide Soil Blends for the Project Site.
  - a. Read Custom Soils,  
5 Pond Park Road,  
Suite L, Hingham Massachusetts,  
781-828-6300,  
[www.readcustomsoils.com](http://www.readcustomsoils.com)
  - b. D & H Loam,  
2352 Main Street,  
Concord, Massachusetts,  
978-897-4901,  
[www.dhloam.com](http://www.dhloam.com)
  - c. New England Specialty Soils (N.E.S.S.),  
435 Lancaster Street,  
Leominster, Mass,  
978-230-2244,  
[www.nesoils.com](http://www.nesoils.com)
  - d. AgreSource inc.,  
100 Main Street,  
Amesbury, MA 01913  
Tel: 800-313-3320;  
[www.agresourceinc.com](http://www.agresourceinc.com)

- e. Or approved equal

1.06 EXAMINATION OF CONDITIONS

- A. The Contractor and any Sub-Contractor responsible for the execution of the Work of this section, PLANTING SOILS, shall review and confirm in writing that the existing elevations are correct prior to proceeding with the spreading of the planting soil.
- B. Carefully review the requirements of this section, PLANTING SOILS, to understand the requirements of testing, compaction, slope, and absence of debris on the existing soils prior to spreading of the planting soils.
- C. The Contractor shall be solely responsible for judging the full extent of work requirements involved.

1.07 DEFINITIONS

- A. Planting Soils to include Planting soil, Amended Existing Soil and Bioretention Basin Soil. Bioretention Basin Soil for use in bioretention basin, Planting Soil for use backfilling new plantings and Amended Existing Soil for use in all other planted or seeded areas as indicated on the Drawings. The following definitions shall apply to the work of this Section.
- B. The following size distributions of mineral particles by diameter and sieve size shall apply to the following conventional names of soil types:

<u>Conventional Name</u>	<u>Retained on U.S. Sieve No.</u> <u>Diameter (mm)</u>
Very coarse sand	#18 1 - 2
Coarse sand	#35 0.5 - 1
Medium sand	#60 0.25 - 0.5
Fine sand	#140 0.10 - 0.25
Very fine sand	#270 0.05 - 0.10
Silt	by hydrometer 0.002 - 0.05
Clay 0.002	by hydrometer Less than 0.002

- C. Loamy sands shall conform to USDA Soil Taxonomy definitions and as follows: Soil material that contains at the upper limit 85 to 90 percent sand, and the percentage of silt



plus 1.5 times the percentage of clay is not less than 15; at the lower limit the soil material contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30 percent.

1. Loamy coarse sand: 25 percent or more very coarse and coarse sand, and less than 50 percent any other one grade of sand.
  2. Loamy sand: 25 percent or more very coarse, coarse, and medium sand, and less than 50 percent fine or very fine sand.
  3. Loamy fine sand: 50 percent or more fine sand or less than 25 percent very coarse, coarse, and medium sand and less than 50 percent very fine sand.
  4. Loamy very fine sand: 50 percent or more very fine sand.
- D. Sandy Loam shall conform to USDA Soil Taxonomy definitions and as follows: Soil material that contains either 20 percent clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30 percent, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 percent and 52 percent sand.
1. Coarse sandy loam: 25 percent or more very coarse and coarse sand and less than 50 percent any other grade of sand.
  2. Sandy loam: 30 percent or more very coarse, coarse and medium sand, but less than 25 percent very coarse sand, and less than 30 percent very fine or fine sand.
  3. Fine sandy loam: 30 percent or more fine sand and less than 30 percent very fine sand or between 15 and 30 percent very coarse, coarse, and medium sand.

#### 1.08 QUALITY ASSURANCE AND QUALITY CONTROL

- A. Contractor shall use only employees qualified by education and experience to perform each of the individual tasks (i.e. earthwork, wetland planting soils, and maintenance). Education, experience, and certification or license by appropriate organizations will be reviewed to evaluated competence.
- B. Contractor shall be solely responsible for quality control of the work.
- C. All costs related to testing or replacement of non-conforming materials shall be paid for by the Contractor at no additional cost to the Owner, and the costs thereof will be deducted by the Owner.
- D. Contractor shall attend a pre-construction meeting with the Town of Arlington Conservation Commission or their Administrator to ensure that the Order of Conditions is understood by the Contractor.
- E. The Contractor shall maintain a copy of the Order of Conditions at the Site for reference.

- F. All work shall conform to the Drawings and Specifications, except as modified by the Owner's Representative, and shall comply with applicable codes and regulations.

#### 1.09 COORDINATION AND CONSTRUCTION SEQUENCE

- A. Contractor shall refer to Section 01010, SUMMARY OF WORK, for overall coordination and sequencing.

### PART 2 - PRODUCTS

#### 2.01 LOAM - GENERAL

- A. The Contractor shall provide sufficient loam borrow to complete all loaming operations required of the Contract Documents, as specified, provided, installed and paid for under Section 02950, PLANTING SOILS, and as directed by the Engineer. Loam Borrow shall be obtained from one of the following sources:
  1. On-site topsoil stripped, stockpiled and paid for under the work of Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING, of this Specification and amended to meet the requirements of Section 02950, PLANTING SOILS.
  2. A commercial facility specializing in the stockpiling and/or manufacturing of loam.
  3. On-site granular material stripped and stockpiled on the site may be used as the base for an on-site, manufactured loam. Submit method and schedule of manufacturing process to the Engineer for review and approval.
  4. All sources shall be acceptable provided that, after testing and the addition of necessary soil additives specified in this Section, the loam borrow meets the following Specifications.

#### 2.02 PLANTING SOIL

- A. Planting Soil shall be one of the following sandy loams: "course sandy loam", "sandy loam", and "fine sandy loam"; as determined by mechanical analysis (ASTM D 422) and based on the "USDA Classification System" as defined in this Section. It shall be of uniform composition, without admixture of subsoil.
- B. It shall be free of stones greater than one and one-quarter inches, lumps, plants and their roots, debris, and other extraneous matter as determined by the Owner's Representative. Planting Soil shall have the following grain size distribution for material passing the #10 sieve:

Percent Passing

U.S. Sieve Size No.	Minimum	Maximum
10	100	
18	85	95
35	60	85
60	42	65
140	21	44
270	18	24
0.002 mm	2	4

- C. Maximum size shall be one and one quarter inches largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample. It is anticipated that stripped, on-site subsoils will require screening to meet these requirements.
- D. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 6.0 or less. ( $D80/D30 < 6.0$ )
- E. Organic content and pH for specific planting use shall be as follows:
  - a. pH: 5.5 through 6.5 for non-acid loving plants.
  - b. pH: 4.5 through 5.5 for acid-loving plants.
  - c. Organic Content 4.0 - 6.0 percent as determined by the loss on ignition of oven-dried samples passing #10 sieve (Muffle furnace temperature: 450 +/- 10 degrees C for 8 hours).
  - d. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed 2.5 mmhos/cm (dS/m).
  - e. The compost shall be screened to 1/2-inch maximum particle size and shall contain not more than 3 percent material finer than 0.002mm as determined by hydrometer test on ashed material.
  - f. Nutrient content shall be determined by the Testing Laboratory or equivalent laboratory and utilized to evaluate soil-required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), and buffer pH.

- g. Organic Matter for amending planting soils shall be a stable, humus-like material produced from the aerobic decomposition and curing of Leaf Yard Waste Compost, composted for a minimum of one year (12 months). The leaf yard waste compost shall be free of debris such as plastics, metal, concrete or other debris. The leaf yard waste compost shall be free of stones larger than 1/2", larger branches and roots. Wood chips over 1" in length or diameter shall be removed by screening. The compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria as reported by laboratory tests.
- F. Planting Soil shall be pH adjusted for particular planting applications and shall be adjusted prior to delivery to the Project sites as recommended by UMASS Soil & Plant Tissue Laboratory test results.
  - 1. When pH of loam borrow is equal to or greater than 7 use aluminum sulfate to adjust pH downward to required levels.
  - 2. When pH of loam borrow is less than 7 use either sulfur or ferrous sulfate to adjust pH downward to required levels.
  - 3. When pH of loam borrow must be raised to the required levels use limestone.
  - 4. Regardless of amendment Contractor chooses to use, Contractor, not the Owner, shall be responsible for obtaining specified pH by seeding and/or planting time.
- G. Planting Soil shall be free of plants and their roots, debris and other extraneous matter. It shall be uncontaminated by salt water, foreign matter and substances harmful to plant growth. The electrical conductivity (EC2) of a 1:2 soil-water suspension shall be equal to or less than 1.0 milliohms/cm. (Test minus sieve #4 material.) Loam borrow shall not have levels of extractable aluminum greater than 200 parts per million except for acid-loving plants.
- H. Planting Soil may be the manufactured product of a commercial processing facility specializing in the production of manufactured soils and loam borrow. Loam borrow shall be manufactured from sands, silts, clays, and biosolids as specified, performed and paid for under the work of this Section. Loam borrow may be manufactured outside the project area and delivered to the project for spreading or the component soils and organics may be delivered to project site and mixed in situ.
  - 1. Manufactured loam borrow shall be manufactured sufficiently in advance of spreading on the project so that ammonium, pH, soluble salts and the Carbon/Nitrogen ratio will have stabilized at the time of sampling and testing by the Contractor. On-site testing of manufactured loam borrow will be performed by the Contractor to verify that delivered material meets the requirements of this Section.

2. Manufactured loam borrow shall contain equal amounts of biosolid compost and leaf mulch to establish the required organic levels.
- I. On-site topsoil stripped, stockpiled, and paid for under the work of Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING, may be re-used if, with or without amending or blending with other material, it meets the above requirements. Care must be used in the stripping and handling of existing topsoil resources to preserve the quality and integrity of the media On-site topsoil and amendments shall be tested in accordance with requirements for loam borrow and submittals shall be made for review and acceptance as specified, performed and paid for under this Section. The Contractor shall provide additional loam borrow as required to complete the required work.
  - J. All loam borrow proposed for use shall be tested for conformance to the Specifications.
  - K. The Engineer reserves the right to reject on or after delivery to the project site any material which does not, in her/ his opinion, meet these Specifications.

2.03 BIORETENTION BASIN SOIL

- A. Bioretention Basin Soil shall be for bioretention basin only.
  - B. Bioretention Basin Soil shall have a sandy loam/loamy sand texture per USDA textural triangle. Maximum clay content is 5%. The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than one and one-quarter inches in diameter. No other materials or substances shall be mixed or dumped with the Bioretention Basin Soil that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda Grass, Quackgrass, Johnson Grass, Mugwort, Nutsedge, Poison Ivy, Canadian Thistle, Tearthumb, or other noxious weeds.
1. Gradation for Material Passing the Number 10 Sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	100	--
18	70	90
35	42	75
60	24	40
140	13	20
270	10	13
0.002mm	2	4



- |    |  |  |
|----|--|--|
| 2. | stability CO2 evolution test                 | <10 mg CO2 - C/g BVS/day   |
|    | or   |  |
|    | Dewar self-heating test                      | <10 degrees C above room temp.   |
|    | or   |  |
|    | Woods End Laboratory's Compost Test Kit      |  |
|    |  |  |
| 3. | organic content                              | 40 percent minimum dry weight (Loss on Ignition; minus #10 Sieve, 430 degrees C) |
|    |  |  |
| 4. | particle size    90 percent passing 0.5 inch | screen, 100 percent passing one-inch screen                                      |
|    |  |  |
| 5. | inorganic debris                             | 1 percent maximum (dry weight)   |
|    |  |  |
| 6. | pH   | minimum 5.5 - maximum 8.0  |
|    |  |  |
| 7. | Soluble Salts                                | >2 and <4.0 mmhos/cm (ds/m)  |
|    |  |  |
| 8. | density                                      | 850-1,050 lb./cy   |

E. Peat moss shall not be used.

F. Sand, as required for mixing with topsoil to meet Specification requirements shall be uniformly graded coarse sand consisting of clean, inert, rounded grains of quartz or other durable rock and free from loam or clay, surface coatings, mica, other deleterious materials with the following gradation.

Percent Passing by Weight

<u>Sieve No.</u>	<u>Sieve Size (mm)</u>	<u>Maximum</u>	<u>Minimum</u>
4	4.8	-----	100
10	2	100	80
18	1	86	58
35	0.5	50	18
60	0.25	24	7
140	0.10	0	10
270	0.05	0	4.5
	0.002	0	0.3

1. The ratio of the particle size for 70% passing (D<sub>70</sub>) to the particle size for 20% passing (D<sub>20</sub>) shall be 4.0 or less. (D<sub>70</sub>/D<sub>20</sub> < 4.0)

i. The compost shall contain no biosolids.

H. Compost shall be free of stones greater than one and one-quarter inches, lumps, plants and their roots, debris, and other extraneous matter as determined by the Owner's Representative.

## 2.05 EROSION CONTROL

A. Erosion Control methods include straw mulch, erosion control matting, and straw wattles as required in Sections 01568, EROSION AND SEDIMENT CONTROL, 02952, SEEDING AND SODDING, and 02900, PLANTING.

## PART 3 - EXECUTION

### 3.01 BIORETENTION BASIN SUBGRADE INFILTRATION TESTING

A. Conduct bioretention basin subgrade infiltration testing in conformance with Section 01450, SAMPLING AND TESTING

### 3.02 PLANTING SOIL

A. Excavated native soil shall be stockpiled and amended with compost for use as Planting Soil per this Specification Section, PLANTING SOILS prior to being placed in areas designated on the Contract Drawings.



- B. Place Planting Soil on subgrades free of mud, frost, snow, or ice.

### 3.03 MIXING OF PLANTING SOIL MIXES

- A. Soil blends shall be produced with equipment that blends together each component in a thorough and uniform manner. This may be accomplished by a minimum of three handling events on a hard surfaced area with earth moving equipment or by alternately passing soil components through a screener.

### 3.04 FILLING AND COMPACTION

- A. Subsoil or ordinary borrow shall have been excavated and filled as required by the Contract Documents and specified and paid for under Division 2 Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING, of this Specification. Do not damage the work previously installed. Maintain all required angles of repose of materials adjacent to the loam as shown on the Contract Documents. Do not over excavate compacted subgrades of adjacent pavement or structures during loaming operations.
- B. Confirm that the subgrade is at the proper elevation and that no further earthwork is required to bring the subgrade to proper elevations. Subgrade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the Contract Documents. Provide a written report to the Owner and the Engineer that the subgrade has been placed to the required elevations and that the subgrade drains water at the rates specified under the required percolation tests specified, performed and paid for under this Division 2 Section, PLANTING SOILS. Perform no work of placing and spreading soils until elevations have been confirmed and written report has been accepted by the Landscape Architect.
- C. Clear the subgrade of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout or other material harmful to plants have been spilled into the subgrade material, excavate the soil sufficiently to remove the harmful material. Such construction debris, trash, rubble and foreign material shall be removed from the site and disposed of in a legal manner. Fill any over excavation with approved fill and compact to the required subgrade compaction levels.
- D. Do not proceed with the installation of Planting Soils until all utility work in the area has been installed.
- E. Protect adjacent walls, walks and utilities from damage or staining by the Planting Soils. Use 0.5-inch plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.

### 3.05 INSTALLATION OF PLANTING SOILS

- A. Immediately prior to dumping and spreading planting soils, the subgrade shall be cleaned of all stones greater than 2 inches and all debris or rubbish. Such material shall be removed from the site, not raked to the edges and buried.
- B. After removal of all stones greater than 2 inches in size is completed, the subgrade shall be “scratched” to a depth of 4 inches with a backhoe to break up compaction caused by construction vehicles. Notify the Engineer that the subsoil has been cleaned and “scratched” to request his/her attendance on site to review and approve subgrade conditions prior to spreading of loam borrow.
- C. Planting soil delivered to the site shall be protected from erosion at all times. Materials shall be spread immediately. Otherwise, materials that stored on site for more than 24 hours shall be covered with tarpaulin or other soil erosion system acceptable to the Engineer and surrounded by silt fence as specified under the work of Section 01570, ENVIRONMENTAL CONTROLS, of this Specification and installed and paid for under the work of Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING, of this Specification.
- D. No planting soil shall be handled, planted, or seeded in any way if it is in a wet or frozen condition. A moist loam borrow is desirable.
- E. Contractor shall install Planting Soil as backfill for planting holes.
- F. Soil additives shall be spread and thoroughly incorporated into the layer of planting soil by harrowing or other methods reviewed by the Engineer. The following soil additives shall be incorporated:
  - 1. Ground limestone or acidulant as required by soil analysis to achieve the required pH as described in this Section. Spread limestone at the rate required by soil analysis up to a maximum limit of 200 pounds per 1,000 square feet.
  - 2. Organic compost, sand or other soil amendments as required by soil analysis.
- G. After Planting Soil and required additives have been spread, carefully prepare the planting soils by scarifying, harrowing, or tilling the soil to integrate soil additives into the top 6 inches of the soil. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove from unscreened soils all stones over 1 inch in diameter from the top 6 inches of the planting area. Planting soils shall also be free of smaller stones in excessive quantities as determined by the Engineer.
- H. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Deviation from indicated elevations that are greater than one-tenth of a foot shall not be permitted. Connect contours and spot elevations with an even slope. Finish grades shall be smooth and continuous with no abrupt changes at the top or bottom of slopes.

- I. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional planting soils and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades.
- J. The Contractor shall install the planting soils in successive horizontal lifts no thicker than 12 inches in plant beds and bioretention basins to the desired compaction as described in this Section. The Contractor shall install the soil at a higher level to anticipate any reduction of planting soil volume due to settling, erosion, decomposition, and other similar processes during the warranty period. The Engineer will ensure that the full 12 inches of planting soil are obtained by digging holes in the placed soils at the same frequency as for compaction testing.
- K. Select equipment and otherwise phase the installation of the planting soils to ensure that wheeled equipment does not travel over subsoil, placed fills or ordinary borrow or already installed soil. Movement of tracked equipment over said soils will be reviewed and considered for approval by the Engineer. If it is determined by the Engineer that wheeled equipment must travel over already installed soil, provide a written description of sequencing of work that ensures that compacted soil is loosened and uncompacted as the work progresses or place one-inch thick steel plate ballast (or equivalent ballast approved by the Engineer) over the length and width of any travel way to cover planting soils to protect it from compaction.
- L. Compact each lift sufficiently to reduce settling but not enough to prevent the movement of water and feeder roots through the soil. The planting soils in each lift should feel firm to the foot in all areas and make only slight heel prints. At completion of the planting soils installation, the soil should offer a firm, even resistance when a soil sampling tube is inserted from lift to lift. After the placement of each lift, perform percolation tests to determine if the soil has been over compacted. Perform the following percolation test procedure:
  - 1. Dig a hole in the installed soil that is a minimum of 4 inches in diameter. Holes in 12-inch lifts in plant beds shall be 8 inches deep. Do not penetrate through the lift being tested.
  - 2. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
  - 3. In the event that the water drains at a rate less than one inch per hour, till the soil to a depth required to break the over compaction.
  - 4 Perform a minimum of one soil percolation test per 2,500 square feet of tree and shrub planting area as directed by the Engineer.
- L. **Compaction of BIORETENTION BASIN SOILS:** Compact each lift of Bioretention Basin Soils to 86-88% of maximum Standard Proctor density according to ASTM D 698.
- M. Contractor shall be responsible for maintaining all stockpiles of planting soils on the site

until final placement. Upon written approval by the Engineer, Contractor shall remove all excess, unused planting soils and material excavated from the site and dispose of it in a legal manner.

### 3.06 ACCEPTANCE OF FINAL GRADES

- A. Confirm that the final grade of the Planting Soils are at the proper finish grade elevations. Adjust grade as required to meet the contours and spot elevations noted on the Plans. Request the presence of the Owner's Representative to inspect final grade. Do not proceed with the remaining work of this Contract until the Owner's Representative has given his/her written approval of the final grade.

### 3.07 FIELD QUALITY CONTROL OF BIORETENTION BASIN SOILS

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:
  - 1. Compaction: Test bioretention basin soil compaction after placing each lift and at completion of each Bioretention Basin, using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698.

### 3.08 PROTECTION OF PLANTING SOILS:

- A. Protect areas of on-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
  - 1. Storage of construction materials, debris, or excavated materials.
  - 2. Parking vehicles or equipment.
  - 3. Vehicular, pedestrian, and animal traffic.
  - 4. Excavation or other digging unless otherwise indicated.
- B. If planting soils or subgrade are over-compacted, disturbed or contaminated by foreign or deleterious materials or liquids, remove the soil media and contamination; restore the subgrade as directed by the Engineer, and replace contaminated planting soils with new planting soils at no cost to the owner.

### 3.09 COORDINATION AND EXCESS MATERIALS

- A. Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.
- B. Excess Planting Soil Mixtures and Materials: Remove excess planting soil stockpiles and mixture materials from the site at no additional cost to the Owner unless otherwise requested.

END OF SECTION 02950

## SECTION 02952

### SEEDING AND SODDING

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. The General Documents, as listed on the Table of Contents, and applicable parts of Division 1, GENERAL REQUIREMENTS, shall be included in and made part of this Section.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

##### 1.02 SUMMARY

- A. The work of this Section shall include turf seeding for the purpose of turf restoration. Furnish all labor, equipment, materials and related items required for the completion of the work of this Section. Work shall include, but is not necessarily limited to the following:
  - 1. Preparation of seed bed.
  - 2. Procurement of Meadow seed mix before May 15.
  - 3. Seeding of Woodland, Meadow, Tall Turf and Lawn Seed Mixes.
  - 4. Placement of straw mulching.
  - 5. Installation of microclover sod.
  - 6. Installing and removing Temporary Seed Establishment Fence.
  - 7. Maintenance and protection for one (1) full growing season.

##### 1.03 RELATED WORK

- A. The following items are specified and included in other Sections of the Specifications:

7. Section 01568, EROSION AND SEDIMENT CONTROL
8. Section 02100, SITE PREPARATION
9. Section 02630, STORMWATER FACILITIES
10. Section 02950, PLANTING SOILS

#### 1.04 REFERENCES

- A. Massachusetts Department of Environmental Protection (DEP), “Massachusetts Wetlands Replication Guidelines”, March 2002.
- B. U.S. Army Corps of Owner’s Representatives (USACE), New England District Regulatory Branch, latest edition. “Checklist for Review of Mitigation Plan.”

#### 1.05 SUBMITTALS

- A. Identify nursery source and availability of specified seed mixes within 30 days of the award of contract. Submit to Owner’s Representative for approval before ordering material.
- B. At least 30 days prior to the first day of the seeding season described in this Section, submit to the Owner’s Representative proof of certification of Foreman or Crew Leader as Massachusetts Certified Landscape Professional or Massachusetts Certified Horticulturist in accordance with QUALITY ASSURANCE paragraph of this Section.
- C. Submit proof of landscape contractor's experience to the Owner’s Representative in accordance with QUALITY ASSURANCE paragraph of this Section.
- D. At least 30 days prior to intended use, the Contractor shall provide the following samples and submittals for approval in conformance with the requirements of this Section. Do not order materials until Owner’s Representative's acceptance of samples, certifications or test results has been obtained. Delivered materials shall closely match the approved samples. Acceptance shall not constitute final acceptance. The Owner’s Representative reserves the right to reject on or after delivery any material that does not meet these Specifications. Submit the following in accordance with Section 01300, SUBMITTALS:
  1. Material Sampling and Testing of Planting Soils from Off-Site Sources shall be as described in Section 02950, PLANTING SOILS.
  2. Seed Inoculation of Legumes: submit a certified statement from the nursery that all legume seeds come with the appropriate inoculants.
  3. Certified Weed-Free Type ‘AA’ Mulch: Copies of certification and material sample.
  4. Manufacturer’s source and product data of microclover sod.

5. Temporary Seed Establishment Fence: Provide manufacture's product data for wood stakes, goose fence fabric and netting fasteners (galvanized staples or plastic ties).
- E. Construct a representative Temporary Seed Establishment Fence section sample on-site. Sample shall be constructed prior to the installation of Seed Establishment Fencing work to facilitate comparisons during construction. The sample shall demonstrate the typical installation of fence posts, netting and netting fasteners. The accepted sample, upon approval, shall be maintained as the standard of minimal quality for approval of all proposed Seed Establishment Fencing required for the project. Unacceptable sample sections shall immediately be removed from the site and additional samples constructed for acceptance by the Owner's Representative.
- F. Maintenance Instructions: At the time of Acceptance, the Contractor shall submit complete maintenance instructions for the Owner's use. The instructions shall be reviewed for approval by the Owner's Representative as a pre-condition for Acceptance.

#### 1.06 EXAMINATION OF CONDITIONS

- A. All areas to be improved shall be inspected by the Contractor and instrument survey performed to verify grading before starting work and any defects such as incorrect grading or drainage problems shall be reported to the Owner's Representative prior to beginning this work. The commencement of work by the Contractor shall indicate his acceptance of the areas to be improved and assume full responsibility for the work of this Section.
- B. Contractor shall be solely responsible for judging full extent of work involved.

#### 1.07 QUALITY ASSURANCE

- A. Qualification of Landscape Contractor: The work of this Section shall be performed by a landscape contracting firm which has successfully installed work of a similar quality, schedule requirement, and construction detailing with a minimum of five years experience. Proof of this experience shall be submitted per SUBMITTALS paragraph of this Section.
- B. Qualification of Foreman or Crew Leader: All work of seeding shall be supervised by a foreman or crew leader who is a certified landscape professional.
1. Landscape professional shall be a Massachusetts Certified Landscape Professional certified by the Associated Landscape Contractors of Massachusetts.
  2. Certification shall be current. Proof of certification shall be submitted per SUBMITTALS paragraph of this Section.
- C. Seed Sources:
1. Woodland Seed Mix and Tall Turf Seed Mix

a. Ernst Conservation Seed  
8884 Mercer Pike  
  
Meadville, PA 16335  
  
Tel. (800) 873-3321, Fax (814) 336-5191  
  
[www.ernstseed.com](http://www.ernstseed.com)

b. Or approved equal

2. Meadow Seed Mix

a. New England Wetland Plants  
820 West Street  
  
Amherst, MA 01002  
  
Tel. (413) 548-8000  
  
[www.newp.com](http://www.newp.com)

b. Ernst Conservation Seed  
8884 Mercer Pike  
  
Meadville, PA 16335  
  
Tel. (800) 873-3321, Fax (814) 336-5191  
  
[www.ernstseed.com](http://www.ernstseed.com)

c. Prairie Moon Seed  
32115 Prairie Lane  
  
Winona, MN 55987  
  
Tel. 866-417-8156  
  
[www.prairiemoon.com](http://www.prairiemoon.com)



c. Or approved equal

3. Lawn Seed Mix

a. Allen's Seed  
693 S County Trail  
  
Exeter, RI 02822  
  
Tel. (800) 527-3898  
  
[www.allensseed.com](http://www.allensseed.com)

b. Or approved equal

4. Microclover Sod

a. Sodco  
P.O. Box 2  
  
264 Exeter Road  
  
Slocum, RI 02877  
  
Tel. (800) 341-6900  
  
[www.sodco.net](http://www.sodco.net)

b. Or approved equal

1.08 COORDINATION

- A. Coordinate earthwork and placement of planting soils to determine when seeding, as described in this section, may proceed.
- B. Establish contracts for seeds with suppliers to ensure species and quantity availability as outlined in these Specifications.
- C. The timing and sequence of seeding is dependent upon a number of factors, including the construction schedule and weather. Coordinate with the Owner's Representative.

PART 2 - PRODUCTS

2.01 SEED

- A. Seed mixture shall be fresh, clean, new crop seed. Seed shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and properly labeled containers. All seed shall comply with State and Federal seed laws. Submit manufacturer's Certificates of Compliance. Seed that has become wet, moldy or otherwise damaged shall not be acceptable.
- B. In addition, Percent Pure Live Seed (PLS) shall be calculated for all seed lots using each seed lot's own unique purity and germination test results. Percent Pure Live Seed is defined by the following formula:  $\text{Percent (\%)} \text{ Purity} \times \text{Percent (\%)} \text{ Germination} / 100 = \text{Percent (\%)} \text{ Pure Live Seed (PLS)}$ . The minimum % PLS shall be 75% for each seed lot. A "PLS Pound" is defined as the bulk weight of seed required to equal one pound of 100% pure, germinable seed.
- C. Seed shall be mixed by an approved method on the site or may be mixed by a dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers that shall bear the dealer's guaranteed analysis. If seed is mixed by a dealer then the Contractor shall furnish the Owner's Representative the dealer's guaranteed statement of the composition of the mixture.
- D. The following seed mixes, conforming in plant species to the seeding rates and percentages specified, shall be used in areas as indicated on the Contract Documents and in accordance with the requirements of this Section.
  - 1. **Woodland Seed Mix** shall be manufactured by: New England Wetland Plants, phone: 413-584-8000, fax: 413-549-4000; Ernst Conservation Seeds, phone: 814-336-2404, fax: 814-336-5191; or, approved equal.

a. **Seed Composition – Woodland Seed Mix**

<u>Botanical Name</u>	<u>Common Name</u>	<u>% by Weight</u>
<i>Festuca rubra</i>	Creeping Red Fescue	46.0 %
<i>Agrostis scabra</i>	Rough Bentgrass	22.0 %
<i>Agrostis perennans</i>	Autumn/Upland Bentgrass	15.0 %
<i>Juncus tenuis</i>	Path Rush	3.00 %
<i>Eurybia divaricatus</i>	White Wood Aster	8.0 %

<i>Symphyotrichum cordifolium</i>	Heart-Leaved Aster	3.0 %
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<i>Symphyotrichum patens</i>	Late Purple Aster	3.0 %
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c. Seeding rate for the Woodland Seed Mix shall be 35 pounds per acre or 1 pound per 1,000 square feet.

d. Seed rate for the Woodland Seed Mix in overseeding areas shall be 15 pounds per acre or 1/2 pound per 1,000 square feet.

2. **Meadow Seed Mix** shall be manufactured by New England Wetland Plants, Amherst, MA, ph. 413.548.8000, or approved equal.

a. **Seed Mix Composition – Meadow**

<u>Botanical Name</u>	<u>Common Name</u>	<u>% by Weight</u>
<i>Schizachyrium scoparium</i>	Little Bluestem	35.0%
<i>Elymus canadensis</i>	Canada Wild Rye	20.0 %
<i>Andropogon virginicus</i>	Broom Sedge	5.0 %
<i>Chamaecrista fasciculata</i>	Partridge Pea	5.0%
<i>Agrostis perennans</i>	Autumn Bentgrass	0.5%
<i>Zizia aurea</i>	Golden Alexanders	6.0%
<i>Asclepias tuberosa</i>	Butterfly Milkweed	5.0%

<i>Tradescantia ohioensis</i>	Ohio Spiderwort	4.0%
<i>Aster prenanthoides</i>	Zig Zag Aster	4.0 %
<i>Aster macropyllus</i>	Big-leaf Aster	3.0 %
<i>Monarda fistulosa</i>	Wild Bergamot	2.0 %
<i>Rudbeckia hirta</i>	Blackeyed Susan	2.0%
<i>Senna hebecarpa</i>	Wild Senna	2.0%
<i>Solidago nemoralis</i>	Grey Goldenrod	1.5%
<i>Geum laciniatum</i>	Rough Avens	1.0 %
<i>Lespedeza capitata</i>	Roundhead Lespedeza	1.0%
<i>Aster novi-belgii</i>	New York Aster	1.0%
<i>Aster laevis</i>	Silky Smooth Aster	0.5%
<i>Aster novae-angliae</i>	New England Aster	0.5%
<i>Solidago juncea</i>	Early Goldenrod	0.5%

<i>Verbena urticifolia</i>	White Vervain	0.5%
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b. Seeding rate for the Meadow Mix shall be 30 pounds per acre or 1/2 pound per 1,000 square feet.

3. **Tall Turf Seed Mix** shall be low maintenance, native lawn grass seed mix for the vegetated conveyance swale, manufactured by Ernst Conservation Seed or, approved equal.

**Seed Mix Composition – Tall Turf**

<u>Common Name</u>	<u>% by Weight</u>
Festuca rubra - Creeping Red Fescue <i>(varieties to be approved by Landscape Architect)</i>	70%
Festuca ovina – Hard Fescue <i>(varieties to be approved by Landscape Architect)</i>	10%
Festuca ovina – Sheep Fescue <i>(varieties to be approved by Landscape Architect)</i>	10%
Lolium multiflorum – Annual Rye Grass	10%

a. Grass varieties shall be within the top 50 percent and 25 percent respectively, of varieties tested in National Turfgrass Evaluation Program, or currently recommended as low maintenance varieties by University of Massachusetts or the University of Rhode Island.

b. Seeding rate shall be 5 pounds per 1,000 square feet for new seeding and 4 pounds per 1,000 square feet for overseeding.

4. **Lawn Seed Mix** shall be low maintenance, native lawn grass seed mix similar to Allen’s seed mix or, approved equal.

Common Name % by Weight

Kentucky Bluegrass 30%

*(at least three improved varieties to  
be approved by Owner's Representative)*

Creeping Red Fescue or Chewings Fescue 45%

*(varieties to be approved  
by Owner's Representative)*

Perennial Rye 25%

- a. Bluegrass and rye grass varieties shall be within the top 50 percent and 25 percent respectively, of varieties tested in National Turfgrass Evaluation Program, or currently recommended as low maintenance varieties by University of Massachusetts or the University of Rhode Island.
- b. Seeding rate shall be 5 pounds per 1,000 square feet for new seeding and 4 pounds per 1,000 square feet for overseeding.

## 2.02 MICROCLOVER SOD

- A. Sod shall be nursery grown Microclover black beauty sod as manufactured by Sodco, Exeter Rd, Slocum, RI 02877, tel. 800-341-6900, [www.sodco.net](http://www.sodco.net) or approved equal. Microclover mix shall be kentucky bluegrass, fescue blend and shall not include white clover or dutch clover. Sod shall be uniform in appearance.
- B. Sod shall be machine cut from an established sod farm specializing in the production and harvesting of top quality, grass turf products. Sod shall be machine cut at a uniform soil thickness of 3/4-inch +/- 1/4 inch, at the time of cutting. Measurement for thickness shall exclude top growth and thatch. Individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be 5 percent. Broken pads and torn or uneven ends will not be acceptable. Sod shall be at least one year old from time of original seeding.

- C. Sod shall be free of grass species other than those specified in this Section. Sod shall be free of weeds.
- D. Sod shall be furnished and installed in rectangular sod strips measuring 12 inches or 16 inches in width and from 4 feet to 6 feet in length, stored in rolls with the grass top side inverted so that the topsoil is to the exterior.
- E. Sod shall be harvested, delivered and installed within a period of 36 hours. Soil on sod pads shall be kept moist at all times.
- F. Stakes: Stakes for pegging the sod shall be sound hardwood approximately one inch by 2 inches and of sufficient length to penetrate the mat, the seed bed and to a minimum depth of 2 inches of subsoil. Stakes shall be free from insects and fungi and capable of remaining in the ground at least 2 years.
- G. Sod delivered to the construction site which does not conform to the requirements of this Section, will be rejected by the Owner's Representative and shall be removed from the site by the Contractor at no additional cost to the Owner. Sod found to contain unacceptable levels of unspecified grass species or weed species at any time up to and including Final Acceptance will be rejected by the Owner's Representative. Contractor shall remove such sod from the site at no additional cost to the Owner. Contractor shall replace unacceptable sod with new, approved sod at no additional cost to the Owner. The Owner's Representative shall be the sole judge of what constitutes acceptable or unacceptable levels of unspecified grass species or weed species.

#### 2.03 STRAW MULCH

- A. Use Class 'AA' straw or Class 'A' straw as defined in EROSION AND SEDIMENT CONTROL Section 01568. Fiber mulch products applied with a hydraulic seeder may be used in conjunction with straw.

#### 2.04 TEMPORARY SEED ESTABLISHMENT FENCE

- A. Netting shall be polypropylene goose fence netting, aperture size 1.0" x 0.75", 42 inch height, as manufactured by Pinelands Nursery and Supply, or approved equal.
- B. Hardwood stakes shall be southern yellow pine, full 1.5 inches by 1.5 inches width, by five (5) feet minimum length, free from knots or other defects that can cause splitting.
- C. Seed establishment fencing shall be secured to hardwood stakes with galvanized staples or plastic fasteners and shall be located along all new seeded areas and as shown on the Construction Documents.

#### 2.04 WATER

- A. The Contractor shall be responsible to furnish his own supply of water to the site. If possible, the Owner may furnish the Contractor upon request with a source and supply of water at no additional cost to the Contractor. However, if the Owner's water supply is not available or not functioning, the Contractor shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free

from impurities injurious to vegetation.

## PART 3 - EXECUTION

### 3.01 SEED BED PREPARATION

- A. Immediately prior to seeding all seedbeds shall be free of weeds. Use tillage to destroy all pre-existing vegetation at the Upland Meadow seeding sites.
  - 1. Tillage: Two tillage operations (i.e., rototilling, disking, etc.) to an average depth of 3.0 to 5.0 inches. Allow to 2 to 3 weeks between tillage operations to elapse, so that weed seeds and perennial plant parts have time to germinate or regrow, and so be destroyed by the second tilling.
  - 2. In the spring seeding season only: In addition to the use of either tillage or herbicide application or a combination thereof, wait for between 2 and 3 weeks to seed with specified meadow seed mix to allow any remaining weed seeds within the top layers of the soil to germinate. After weed seeds have germinated and grown to a height of between 2 and 3 inches tall, apply a final application of the approved herbicide. Wait one week immediately seed with the specified meadow seed mix.

### 3.02 SOIL PREPARATION FOR SEEDING

- A. Preparation for broadcast seeding:
  - 1. Prepare the weed-free seedbed with rototillers, disk harrows, or other soil preparation equipment and leave the soil with an irregular open surface. Bulldozers used to loosen the soil surface shall leave the surface with an open irregular surface, and with track ridges that run parallel to the slope. All rocks and other debris larger than 2.0 inches in diameter shall be removed from the soil surface. The site shall be leveled so that no irregularities greater than 2 inches above or below grade per linear foot are present. The soil at the time of seeding shall be firm, and the surface shall be loose and open, so that meadow seeds may readily fall into soil spaces.

### 3.03 SEEDING

- A. Contractor shall obtain Owner's Representative's written acceptance of bed preparation before doing any seeding.
- B. The seasons for seeding shall be as follows:
  - Spring: March 1<sup>st</sup> through April 30th
  - Fall: September 1<sup>st</sup> through November 1st
  - \*Winter: November 1<sup>st</sup> through April 15th



The actual planting of seed shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and by accepted practice in this locality. Stabilization using erosion control blanket shall be performed immediately after seeding of upland meadow areas, as directed in accordance with this Section.

- C. Seed only when the bed is in a friable condition, not muddy or hard.
- D. Most species used in the seed mix are generally small and do not benefit from deep planting. Use a minimal planting depth of 0.10 - 0.25 inches in combination with a firm seedbed.
- E. Choice of Seeding Methods: Seed shall be applied by hand or broadcast seeders. Hydraulic seeders shall not be used.
  - 1. Hand Broadcasting: Mix seed in a large volume of a lightweight, inert material such as sawdust or vermiculite. This inert matter shall be slightly damp, so that the seed will stick to it. Apply inert material and seed at a rate of 2 bushel baskets per 1,000 square foot planting area plus the specified weight of seed. Mix seed evenly into the inert material. Take one-half of the total mix and spread it across the area. Take the second half of the mixture and spread it over the same area, walking perpendicular to the first pass. Rake or drag the seed/inert material mixture into the soil so that it is lightly covered with soil one quarter to one-half inch deep. Roll the site with a roller to firm the seed mixture into the soil. Do not roll the soil if the soil is wet.
  - 2. Mechanical Broadcast Seeding: Broadcast seeding on tilled soils shall involve the use of a properly calibrated reciprocating spreader (e.g., Vicon<sup>TM</sup>), a properly calibrated rotary spreader (e.g., Scotts<sup>TM</sup> model R8), a double seed box seeder (e.g. Brillion<sup>TM</sup>) or similar equipment equipped with an agitator to ensure continuous mixing. All of the grass and forb seed intended for the seeding site shall be combined in a barrel or other suitable container with an approved low density, non-toxic inert material bulking agent and thoroughly mixed at the time of seeding. Thorough mixing and the use of one or more inert material bulking agents is required to ensure continuous seed flow through the spreader, and to improve seed distribution by preventing seed mix segregation.

Seed incorporation and soil rolling. After seeding, Meadow seed shall be raked or dragged into the soil surface to an average depth of 0.10 to 0.25 inch. When the soil is in a loose or fluffy condition, the seedbed shall be rolled with a weighted roller, so that the grass and forb seed is firmly pressed into the soil.

- F. Mechanical application (hydroseeding) is acceptable for Tall Turf Seed Mix and Lawn Seed Mix. The Contractor shall notify the Owner's Representative of proposed method, mulch to be used, and type of equipment to be used and shall receive approval prior to beginning this operation.

### 3.04 INSTALLATION OF MICROCLOVER SOD

- A. The season for sodding shall be from April 1 to June 1 and from August 15 to October 1. The actual lawn construction work shall be done, however, only during periods within this season that are normal for such work as determined by weather conditions and by accepted practice in this locality. At his option, and on his own responsibility, the Contractor may proceed under unseasonable conditions without additional compensation, but subject to Owner's Representative's approval of time and methods.
- B. Immediately prior to sodding operations, the loam bed shall be lightly scratched with a fine toothed harrow or hand rake to provide a slightly roughened surface to accept the sodding application.
- C. The soil on which the sod is laid shall be reasonably moist and shall be watered, if necessary. The sod shall be laid smoothly, edge to edge, and where continuous or solid sodding is called for on the plans sod shall be laid with the longest dimension parallel to the contours. Sodding shall start at the base of slopes and progress upwards in continuous parallel rows. Vertical joints between sods shall be staggered. Immediately after laying, press the sod firmly into contact with the soil bed by tamping, rolling, or by other approved methods so as to eliminate all air pockets. Provide true and even surfaces, insure knitting and protect all exposed sod edges, but without displacement of the sod or deformation of the sod surface.
- D. In all swales, and on all slopes steeper than or equal to three to one (3:1) and elsewhere as specified or as directed by the Owner's Representative, sods shall be held in place by stakes. Stakes shall be untreated wood one inch by two inches by twelve inches long. Staking shall be done immediately after tamping. At least one stake shall be driven through each sod to be pegged and the stakes shall be not more than two feet apart. Stakes shall have their flat sides against the slope and be driven flush.

### 3.05 OVER SEEDING

- A. Mow existing vegetation with brush hog mower or sting trimmer. Prepare the area by raking with a metal thatch rake to remove thatch, trimmings, debris and loosen soil surface.
- B. Contractor shall obtain Owner's Representative's written acceptance of bed preparation before doing any seeding.
- C. Overseed at specified seeding rate.
- D. Choice of Seeding Methods: Seed shall be applied by hand or broadcast seeders. Hydraulic seeders shall not be used.

### 3.06 APPLICATION OF STRAW MULCH

- A. Apply approved straw mulch to all seeded areas by chopping and blowing. Apply straw mulch to a depth of 1 inch at a uniform rate.

### 3.07 INSTALLATION OF TEMPORARY SEED ESTABLISHMENT FENCE

- A. Locate and install Seed Establishment Fence in locations shown on the Drawings and in conformance with approved submittals. Seed establishment fence shall be installed along all seeded areas. Offset distance from adjacent path, and height shall be approved in the field by the Owner's Representative based on a constructed sample section in accordance with the SUBMITTALS section.
- B. Seed Establishment Fence located around the limits of the bioretention basin shall not include a 4" wildlife passage gap along bottom.
- C. Removal of the Seed Establishment Fence shall be the responsibility of the Contractor pending Final Acceptance.

### 3.08 MAINTENANCE OF SEEDED AREAS

- A. Maintenance shall begin immediately after any area is seeded and mulched and shall continue for a twelve (12) month active growing period for seeded areas or until Final Acceptance of the project, whichever is longer. In the event that seeding operations are completed too late in the fall for adequate germination and growth of grass and forbs, then maintenance shall continue into the following spring for the minimum 12-month period.
- B. Maintenance shall include reseeding, watering, weeding, remulching, removal of invasive and noxious species (see list in ACCEPTANCE) and replacement of erosion control blanket, as necessary.
- C. Problem weeds such as Ragweed and Foxtail and all MIPAG-listed invasive species shall be hand pulled during the maintenance period.
- D. During the maintenance period, any decline in the condition of seeded areas shall require immediate action to identify potential problems and to undertake corrective measures.
- E. Watering shall be performed for spring and summer seeding only during the first 6 to 8 weeks after seeding. Water in a manner that will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment.

1. The Contractor shall provide all labor and arrange for all watering necessary to establish an acceptable seeded area. Maintain moist soil to a depth of at least 2 inches. At no time shall a tank truck be allowed on the seeded beds.
  2. Beyond the specified 6 to 8 week watering after seeding, water in the absence of adequate rainfall as determined by the Owner's Representative.
  3. Water only in the mornings before 8:00 am. Furnish sufficient watering equipment to apply water to the required soil depths each 24-hour period.
- F. After the grass in seeded areas has germinated, reseed all areas and parts of areas that fail to show a uniform stand of grass. Reseed such areas and parts of areas repeatedly until all areas are covered with a satisfactory growth of grass and/or wildflowers. Reseeding together with mowing shall be done at the Contractor's expense.
- G. Mowing:
1. Woodland Seed Areas
    - a. Do not mow areas seeded with Woodland Seed Mix.
  2. Meadow Areas
    - a. The Contractor shall keep Meadow areas mowed until Acceptance of the Contract by cutting to a height of no lower than eight inches (8") when growth reaches twenty-four inches (24") or as directed by the Landscape Architect. A brush hog mower or string trimmer shall be used. Use of rotary lawn mower is prohibited.
    - b. Leave the clippings which may have viable seeds-in place. The Contractor shall remove the clippings of any weedy or undesirable species that may have set seed.
    - c. Remove and discard from paved and path areas all clippings.
    - d. Mowing during the first year shall cease by September 15<sup>th</sup>.
    - e. Mow the Meadow area the following spring to a height of two inches (2")

when new growth reaches a height of two inches (2”).

3. Tall Turf Area (Vegetated Conveyance Swale)
  - a. The Contractor shall keep Tall Turf areas trimmed until Acceptance of the Contract by cutting to a height of 3 inches when growth reaches 6 inches or as directed by the Landscape Architect.
  - b. A string trimmer shall be used for cutting to prevent damage to the erosion control matting. Do not remove from grass areas any clippings that have been generated by cutting operations. Do not cut grass when wet.
4. Sod and Lawn Areas
  - a. Mowing of Sod and Lawn Areas: First mowing of turf areas shall begin as soon as the grass has reached a height of 3 inches and subsequent mowing shall be at least once a week, or as often as necessary to maintain turf areas at a uniform height of 1-1/2 to 2 inches.

### 3.09 ACCEPTANCE

- A. Following the minimum required maintenance periods for construction, the Contractor shall request the Owner’s Representative in writing for a formal inspection of the completed work. Request for inspection shall be received by the Owner’s Representative at least 10 days before anticipated date of inspection.
- B. Acceptance Requirements
  1. Woodland Areas:
    - a. At the end of the maintenance period, seeded Woodland areas shall have a close stand of grass and/or wildflowers.
    - b. Seeded Woodland areas shall have no bare spots greater than 6 inches in diameter over greater than 75 percent of the overall seeded area (not including plugs). At least 90 percent of the grass and forbs established shall be permanent grass and forb species. If seeded areas are deficient, the Contractor's responsibility for maintenance of all seeded upland areas shall be extended until deficiencies are corrected. Seeded areas to be corrected shall be prepared and reseeded in accordance with the requirements of this Section.
  2. Tall Turf and Meadow Areas:

- a. At the end of the maintenance period, seeded areas shall have a close stand of grass and/or wildflowers with no invasive species present, including but not limited to:

Lythrum salicaria (purple loosestrife)

Phragmites australis (common reed)

Alliaria petiolata (garlic mustard)

Polygonum cuspidatum (Japanese knotweed)

Cynanchum rossicum (pale swallow wort)

- b. Seeded areas shall have no bare spots greater than 6 inches in diameter over greater than 75 percent of the overall seeded area. At least 90 percent of the grass and forbs established shall be permanent grass and forb species. If seeded areas are deficient, the Contractor's responsibility for maintenance of all seeded areas shall be extended until deficiencies are corrected. Seeded areas to be corrected shall be prepared and reseeded in accordance with the requirements of this Section.

3. Lawn Areas:

- a. At the time of acceptance, lawn areas shall be totally established with no bare spots, mowed a minimum of 4 times, and the grass shall be at least 1-1/4 to 2 inches in height.

4. Sodded Areas:

- a. Sodded areas shall be in vigorous growing condition with no discolored, dead or otherwise unacceptable areas. Sod will have knit firmly to the loam subgrade and no weeds shall be present.

C. Owner's Representative's inspection shall determine if maintenance shall continue.

3.10 CLEAN UP

E. Absolutely no debris shall be left on the site. Excavated material shall be removed. Repair any damage to site or structures to restore them to their original condition.

END OF SECTION 02952

## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### PART 1 – GENERAL

##### 1.01 SUMMARY

- A. Provide all equipment and materials, and do all work necessary to complete the concrete work which includes, but is not necessarily limited to the following:
  - 1. Cast-in-place concrete as used in the following:
    - a. Granite Curb (base footing).
    - b. Boardwalk Retrofit (footings).
    - c. Picnic Table (pad).
    - d. Trench Drain and Grate (base footing).
    - e. Check Dam.
    - f. Sediment Forebay (base footing, pad, check dam and weir).

## 1.02 RELATED WORK UNDER OTHER SECTIONS

A. The following items of related work are specified and included in other Sections of the Specifications:

1. Section 02100, SITE PREPARATION
2. Section 02120, EARTH EXCAVATION, BACKFILL, FILL AND GRADING
3. Section 02630, STORMWATER FACILITIES
4. Section 02772, GRANITE CURB
5. Section 02795, POROUS HOT MIX ASPHALT
6. Section 02800, SITE IMPROVEMENTS
7. Section 06100, ROUGH CARPENTRY

## 1.03 REFERENCES

A. Except as noted, work shall conform to the latest edition of the following codes and specifications and standards:

1. American Association of State Highway and Transportation Officials (AASHTO):  

AASHTO M 182	(2005) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats
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2. American Society of Testing and Materials (ASTM):  

ASTM A 82/A 82M	(2007) Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A 108	(2007) Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A36/A36M	Standard Specification for Carbon Structural Steel
ASTM A 496/A 496M	(2007) Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
ASTM A 497/A 497M	(2007) Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete
ASTM A 615/A 615M	(2009) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 775/A 77 M	(2007b) Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A 884/A 884M	(2006) Standard Specification for



	Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM C 31/C 31M	(2009) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 33/C 33M	(2008) Standard Specification for Concrete Aggregates
ASTM C 39/C 39M	(2005e1e2) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 40	(2004) Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
ASTM C 94/C 94M	(2009) Standard Specification for Ready-Mixed Concrete
ASTM C 109/C 109M	(2008) Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
ASTM C 143/C 143M	(2009) Standard Test Method for Slump of Hydraulic Cement Concrete
ASTM C 150	(2007) Standard Specification for Portland Cement
ASTM C 171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM C 172	(2008) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C 173/C 173M	(2009) Standard Test Method for Air Content of Freshly Mixed Concrete by Volumetric Method
ASTM C 231	(2009a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2006) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C 309	(2007) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

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|---|--|
| ASTM C 31/C 31 M                                | (2009) Standard Practice for Making and Curing Concrete Test Specimens in the Field  |
| ASTM C 920                                      | (2008) Standard Specifications for Elastomeric Joint Sealants  |
| ASTM D 1751                                     | (2004; R 2009) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) |
| ASTM D 1752                                     | (2004a; R 2008) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion   |
| 3. American Concrete Institute (ACI):           |  |
| ACI 304R  | (2008) Guide for Measuring, Mixing, Transporting, and Placing Concrete   |
| ACI 305R  | (1999; Errata 2006) Hot Weather Concreting   |
| ACI 306R  | (1988; Errata 2002) Cold Weather Concreting  |
| ACI 315   | Manual of Standard Practice for Detailing Reinforced Concrete Structures   |
| ACI 318   | (2014) Building Code Requirements for Structural Concrete  |
| ACI 347   | (2004) Guide to Formwork for Concrete  |
| ACI SP-66                                       | (2004) ACI Detailing Manual  |
| 4. Concrete Reinforcing Steel Institute (CRSI): |  |
| CRSI 10MSP                                      | (2009; 28Ed) Manual of Standard Practice   |
| CRSI  | (8Ed) Placing Reinforcing Bars   |

#### 1.04 SUBMITTALS

- A. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, curing compounds, rebar mechanical splicers, expansion bolts, and other items if requested by the Owner's Representative.

Contractor shall review all Contract Documents for all items that are required to be embedded in concrete, and shall make necessary provisions as required so that reinforcing steel will not interfere with the placement of such embedded items.

- B. Name and address of Testing Laboratory for approval by Owner's Representative.
- C. Submit three (3) copies of laboratory test reports for concrete materials and mix design tests as specified.
- D. If conveying concrete by pump is requested by the Contractor, submit related data regarding concrete materials, pumping device, and methods to Owner's Representative for approval three (3) weeks before such method is proposed to use.
- E. Corrective Work: Submit drawings showing details of any proposed corrective work, prior to performing corrective work.
- F. Concrete Curing and Protection: Submit to Owner's Representative detailed methods proposed for curing and protecting concrete in normal, cold and hot conditions.
- G. Mill Test Certification: Submit to Owner's Representative, prior to delivery of reinforcing steel or concrete to the job site, certified mill test reports or reinforcing steel and cement, (including names and locations of mills and shops, and analyses of chemical and physical properties), properly correlated to concrete to be used in this Project. This submittal is for information and file record.
- H. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- I. The Contractor shall be responsible for furnishing and installing materials called for in the Contract Documents, even though these materials may have been omitted from approved shop drawings.

#### 1.05 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Contractor shall select and the Owner shall approve a qualified independent testing agency to perform on-site observation and testing during the construction operations. Independent testing agency shall be paid directly by the Contractor and reimbursed by the Owner upon submission of receipts for testing and observation services. Owner will not reimburse Contractor for testing services or field observation when test results indicate that materials do not meet the requirements of this Section.
- B. Sampling and testing for quality control during concrete placement shall include the following, as directed by the Owner's Representative:
  - 1. Sampling Fresh Concrete: ASTM C172
    - a. Slump: ASTM C143; one test at point of discharge for each concrete truck load and one test for each set of compressive strength test specimens.
    - b. Air Content: ASTM C173; volumetric method for light weight or normal weight concrete; ASTM C231, pressure method for normal weight concrete;

- one for each set of compressive strength specimens.
- c. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40 degrees Fahrenheit and below, when 80 degrees Fahrenheit and above, and one test for each set of compressive-strength specimens.
  - d. Compression Test Specimen: ASTM C31: one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
  - e. Compressive Strength Tests ASTM C39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cubic yards more than the first 25 cubic yards of each concrete class placed in anyone day, one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than five are used.
  - 3. When strength of field-cured cylinders is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
  - 4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 pounds per square inch.
- C. Testing: All personnel and laboratories testing concrete shall be licensed by the Commonwealth of Massachusetts.
  - D. Forms and Reinforcing: The Contractor shall verify that forms and reinforcing steel have been installed in accordance with the specified requirements.
  - E. Test results shall be reported in writing to the Owner's Representative and ready-mix producer within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
  - F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
  - G. Additional Tests: The testing agency shall make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Owner's Representative. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with

ASTM C42, or by other methods as directed.

- H. In the event the compressive strength of the cylinders, when tested, is below the specified minimum, the Owner may require test cores of the hardened structure to be taken by the Testing Laboratory in accordance with ASTM C42. If such test indicates that the core specimen is below the required strength, the concrete in question shall be removed and replaced without cost to the Owner. Any other work damaged as a result of this concrete removal shall be replaced with new materials to the satisfaction of the Owner at no additional cost to the Owner. The cost of coring will be deducted from the contract amount. Where core cylinders have been taken by the Testing Laboratory and the concrete proves to be satisfactory, core holes shall be filled in a manner satisfactory to the Owner at no additional cost to the Owner.
- I. The Contractor shall coordinate the date and location of tests with the Owner before any concrete work is started.
- J. The testing laboratory's presence does not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the testing laboratory, any inspection wherever conducted, nor any observations and testing performed by the testing laboratory shall excuse the Contractor from defects discovered in his work, nor relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with Contract requirements, nor shall inspector's acceptance of material or workmanship prevent later rejection of same by the Owner's Representative if defects are discovered.
- K. The Owner reserves the right to modify or waive testing laboratory services.

#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Reinforcing steel shall be transported to the site, stored, and covered in a manner which will ensure that no damage shall occur to it from moisture, dirt, grease, or any other cause that might impair bond to concrete or chip protective epoxy coating. Store reinforcement steel on wood skids to protect it from weather, oil, earth and damage from trucking or other construction operations. A sufficient supply of approved reinforcing steel shall be stored on the site at all times to ensure that there will be no delay of the work. Reinforcement shall be free from loose mill scale, rust, form oil, concrete splatter and other extraneous coating at the time it is embedded in the concrete.
- B. Cement and aggregates shall be stored in such a manner as to prevent deterioration of intrusion of foreign matter. Any materials which have deteriorated, or which have been damaged, shall not be used for concrete.
- C. Identification of steel shall be maintained after bundles are broken.

#### 1.07 EXAMINATION OF SITE AND DOCUMENTS

- A. The Contractor shall carefully examine the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions as indicated in the Contract Documents, or obvious from observations from the site.

- B. Examine Contract Documents, surveys, measurements and dimensions during the bid period. Any discrepancies, errors or omissions shall be brought to the attention of the Owner's Representative prior to submission of a bid.

#### 1.08 USE OF SITE

- A. The Contractor shall conduct his operations so as to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks or other facilities near enough to the work to be affected thereby.

#### 1.09 PERMITS AND CODES

- A. Comply with the local, state and federal rules, regulations, laws and ordinances, and of all other authorities having jurisdiction. All labor, materials, equipment and services necessary to make the work comply with such requirements shall be provided without additional cost to the Owner.

#### 1.10 QUALITY ASSURANCE

- A. All concrete work shall conform to all requirements of ACI 304R (2008), Guide for Measuring, Mixing, Transporting, and Placing Concrete, ACI 305R (1999; Errata 2006) Hot Weather Concreting, ACI 306R (1988; Errata 2002) Cold Weather Concreting, ACI 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures, ACI 347 (2004) Guide to Formwork for Concrete, ACI SP-66 (2004) ACI Detailing Manual, CRSI 10MSP (2009; 28Ed) Manual of Standard Practice, and CRSI (8Ed) Placing Reinforcing Bars.
- B. Pre-installation Conference: N/A.

### PART 2 – PRODUCTS

#### 2.01 CONCRETE MATERIALS

- A. Portland Cement shall be ASTM C150, Type I or II, free from water-soluble salts or alkalis which will cause efflorescence on exposed surfaces. Only one brand of cement shall be used on the project.
- B. Fly ash shall conform to the requirements of ASTM C618, Type C. Fly ash shall not exceed 25 percent of cement content by weight.
- C. Aggregates:
  - 1. Fine Aggregates for Concrete: Shall be natural sand consisting of clean, hard, durable, uncoated particles, conforming to ASTM C33. Organic content shall be determined according to ASTM C33. Organic content shall be determined according to ASTM C40, and supernatant liquid above test sample shall show color no darker than reference standard color solution prepared at the same time. Allow no frozen or partially frozen aggregate in the mix.
  - 2. Coarse Aggregate for Concrete: Use crushed stone or gravel from approved source

conforming to ASTM C33. Maximum size aggregate to be 0.75 inch.

- D. Lightweight Fine and Coarse Aggregates: Rotary kiln expanded shale and conforming to ASTM C330 and as specified in this Section. Aggregate sizes shall include fine aggregate designated as "sand size", and coarse aggregate designated as graded 0.75 inch size.
- E. Admixtures:
  - 1. Calcium chloride, triocyanates, and admixtures containing more than 0.05 percent chloride ions are not permitted.
  - 2. Air-entraining Agent shall conform to ASTM C260 for Air-entraining Admixtures for Concrete. Air-entraining agent must be by the same manufacturer as water-reducing agent.
  - 3. Water Reducing Agent shall conform to ASTM C494 Type A for Chemical Admixtures for Concrete. Water-reducing agent must be by the same manufacturer as air-entraining agent.
  - 4. High-range water reducing admixture (Super Plasticizer) shall conform to ASTM C494, type For Type G.
  - 5. Water-reducing set retarders shall conform to ASTM C494 Type D and may be used when ambient temperatures exceed 80 degrees Fahrenheit. Do not use without specific approval of the Owner's Representative.
  - 6. Accelerator admixture shall be a non-chloride and non-corrosive accelerator conforming to ASTM C494 Type C and may be used when temperatures are below 50 degrees Fahrenheit. Do not use without specific approval of the Owner's Representative.
  - 7. Corrosion inhibitor admixture shall be a calcium nitrite based inhibitor complying with AASHTO MI94 type C, such as W.R. Grace DCI "Corrosion Inhibitor" or approved equal, applied at the rate of 4.0 gallons per cubic yard of concrete.
- F. Water from approved source shall be potable, clean, and free of oils, salt, alkali, organic matter and other deleterious materials detrimental to concrete.

## 2.02 REINFORCING MATERIALS

- A. Reinforcing bars shall be new, deformed billet steel bars, conforming to ASTM A 615, Grade 60 deformed.
- B. Welded wire fabric shall be new, steel, conforming to ASTM A 185, Grade 60.
- C. Reinforcement accessories, consisting of spacers, chairs, ties, and similar items shall be provided as required for spacing, assembling, and supporting reinforcement in place. All accessories shall be dielectric coated steel or approved plastic accessories, conforming to the applicable requirements of the CRSI Standards specified in this Section.
- D. Tie wire for reinforcement shall be 16 gauge or heavier dielectric coated steel or

approved plastic accessories, conforming to the applicable requirements of ASTM A 82.

## 2.03 FORMWORK, COATINGS AND ACCESSORIES

### A. Formwork:

1. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable materials. Provide lumber dressed on at least two edges and one side for tight fit.
2. Chamfer Strips at Top of Wall: Use 0.5 inch, 45 degree strips, nailed 6 inches on center, and installed in inside comers of all forms, unless otherwise directed by the Owner's Representative or shown on the Contract Documents.
3. Chamfer (Reveal) Strips on Exposed Face of Wall: Use either 0.5 inch, 45 degree strips, or 0.5 inch circular strips, nailed 6 inches on center, and installed as shown on the drawings and as directed by the Owner's Representative.

B. Form Coatings shall be non-grain raising and non-staining type that will not leave residual matter on surface of concrete or adversely affect proper bonding of subsequent application of other material applied to concrete surface. Agent shall be chemically active, shall minimize surface voids, leave no residual on concrete, produce a smooth, architectural concrete surface, and shall be specifically formulated for application to the forms used by the Contractor. Coating containing mineral oils or the non-drying ingredients will not be permitted. Provide form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs).

C. Form Ties and Spreaders: Standard metal form clamp assemble and plastic cone, factory fabricated, adjustable-length, removable or snap-off metal, of type acting as spreaders and leaving no metal within 1.0 inch of concrete face and designed to prevent form deflection and to prevent spalling of concrete upon removal. Inner tie rod shall be left in concrete when forms are removed. No wire ties or wood spreaders will be permitted. Use 0.5 inch x 1.0 inch plastic cones for sinkages.

## 2.04 RELATED MATERIALS

### A. Concrete curing membranes conforming to ASTM C 171:

1. Polyethylene film
2. Polyethylene-coated burlap
3. Waterproof paper

B. Absorptive cover shall be burlap cloth made with jute or kenat, weighing approximately 9 ounces per square yard complying with AASHTO M 182, Class 2.

C. Expansion bolts shall be hot-dipped galvanized bolts conforming to Federal Spec. FF-S-325, Group II, type 4, Class 1. Allowable pullout and shear values shall be based on ASTM E488 spacings. Use one of the following or equivalent approved by the Owner's Representative:

1. "Molly Parabol", USM Corporation



2. "Kwikbolt", Hilti Incorporated
3. "Redhead Wedge Anchor", ITT Philips Drill Division

D. Joints:

1. Contraction joint filler shall consist of hard-pressed fiberboard.
2. Expansion joint filler, pre-molded, shall conform to ASTM D 1751 or ASTM D 1752, ½ inch thick, unless otherwise indicated.
3. Joint sealant, cold applied shall conform to ASTM C 920 or ASTM D 5893.

- E. Base material shall be as specified, provided, installed and paid for under Division 2 Section, EARTH EXCAVATION, BACKFILL, FILL AND GRADING, of this Specification.

## 2.05 CONCRETE MIXES

- A. Cast-in-place concrete shall conform to the requirements and applicable provisions of Section M4 of the Standard Specification. Minimum 28-day compressive strength shall be 4,000 pounds per square inch. Slump of concrete shall be 3 inches.
1. Maximum allowable net water content is the total water in the mix at the time of mixing, including free water on aggregate.
  2. Consider any fly ash as part of the cement content for purposes of establishing cement factor and w/c ratio. Limit use of fly ash to not exceed 25 percent of cement content by weight.
  3. Use maximum water-cement equal to 0.45 for concrete subject to freezing and thawing, repeated surface wetting or deicers.
- B. Concrete shall have an air dry weight not exceeding 150 pounds per cubic foot.
- C. Slump Limits: Proportion and design mixes to result in a concrete slump at point of placement of no more than 4 inches.
- D. Air-entraining and water-reducing agents shall be used in all concrete in strict accordance with the manufacturer's printed instructions. Total air-entrained in freshly mixed concrete shall be 5 percent plus or minus 1.0 percent of volume of concrete.
- E. The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed not he work, but without permitting the materials to segregate or excess free water to collect on the surface.
- F. Pre-mix admixtures in solution form and dispense as recommended by the manufacturer. Include the water in the solution in the design water content of the mixtures.
- G. Maximum water-soluble chloride ion (C 1-) in concrete: 0.10 percent by weight of cement.

## 2.06 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (super plasticizer) in concrete, as required by site conditions and approved by the Owner's Representative, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees Fahrenheit.
- C. Use corrosion inhibitor admixture in concrete that will be exposed to a corrosive environment, including waterproofing base slab, topping and wearing slabs subject to vehicular traffic.
- D. Use high-range water-reducing admixture in pumped concrete, and concrete with water-cement ratios below 0.45.
- E. Use air-entraining admixture in concrete exposed to exterior environment and in accordance with manufacturer's written instructions. Interior protected concrete may be air entrained for improved workability. See ACI 301 Table 3.4.1 for required air content except that minimum for all sizes of aggregate shall be 6 percent in exterior environments. Tolerance at point of placement shall be plus or minus one percent.
- F. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

## 2.07 CONCRETE MIXING AND DELIVERY

- A. Ready-Mixed Concrete: use ready-mixed concrete produced by plant acceptable to the Owner's Representative. Hand or site mixing shall not be done. Batch constituents, including admixtures, at central plant. Admixtures shall be premixed in solution form and dispensed as recommended by manufacturer. Comply with requirements of ASTM C94, and as specified.
  - 1. When air temperature is between 85 degrees Fahrenheit and 90 degrees Fahrenheit, reduce mixing and delivery time from 90 minutes to 75 minutes, and when air temperature is above 90 degrees Fahrenheit, reduce mixing and delivery time to 60 minutes.
  - 2. Water may be added at the site only to makeup water withheld at the plant. Batching plant shall document at the driver's delivery ticket any water withheld at the plant. When water has not been withheld and slump is too low for proper handling of concrete, use high-range water reducing admixture to bring slump within specified range.
- B. Transport ready-mixed concrete to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Discharge at site within one and one-half hours after cement was first introduced into mix. Do not use concrete with a temperature greater than 85 degrees Fahrenheit. Central mixed concrete shall be plant-mixed a minimum of five minutes. Agitation shall begin immediately after premixed concrete is placed in truck and shall continue without interruption until discharged. Transit-mixed concrete shall be mixed at mixing speed for at least ten minutes immediately after charging truck followed by agitation without interruption until discharged.

- C. Do not retemper (mixing with or without additional cement, aggregates, or water) concrete that has partially hardened.

## 2.08 PLATES, ANGLES, ANCHORS AND EMBEDMENTS

- A. Plates, angles, Anchors and Embedments shall conform to ASTM A 36, shall be of the size and type indicated on the drawings. They shall be prime painted with inorganic zinc primer, unless otherwise specified to be galvanized.

## PART 3 – EXECUTION

### 3.01 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Forms shall be so braced and tied together that the movement of men, equipment, materials, or placing and vibrating the concrete will not throw them out of line or position. Securely brace and shore forms, making them sufficiently tight, to prevent the leakage of concrete. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following A.C.I. 347 limits:
  - 1. Provide Class B tolerances for all formed concrete surfaces.
- B. Construct forms to sizes, shapes, lines and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, chamfers, blocking, and other features required in the Work. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges, and reveal strips, as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

### 3.02 PLACING REINFORCEMENT

- A. General: Place reinforcing steel in accordance with the Contract Documents and approved Shop Drawings. Comply with CRSI's Recommended Practice for Placing Reinforcing Bars, for details and methods of reinforcement placement and supports.
1. Install reinforcement accurately and secured against movement, particularly under the weight of workmen, the placement of concrete and vibration work.
  2. Reinforcing Steel Supports: Bars shall be supported on approved plastic or dielectriccoated metal chairs or spacers, accurately placed and securely fastened to forms or steel reinforcement in place. Additional bars shall be supplied, whether specifically shown on the Contract Documents or not, where necessary to securely fasten reinforcement in place. Support legs of accessories in forms without embedding in form surface. Spacing of chairs and accessories shall conform to CRSI's "Recommended Practice for Placing Bar Support". No wood will be permitted inside forms. Lifting of welded wire fabric into proper position while concrete is being poured rather than supporting fabric on chairs will not be permitted.
  3. Placing and Tying: All reinforcement shall be set in place, spaced, and rigidly and securely tied or wired with tie wire at all splices and at all crossing points and intersections in the positions shown, or as directed. Re-bending of bars on the job to accommodate the job to accommodate existing conditions will not be permitted without the written approval of the Owner. Point ends of wire ties away from forms.
  4. Spacing: Minimum center to center distance between parallel bars shall be in accordance with the details on the Contract Documents, or, where not shown, the clear spacing shall be 2 times the bar diameter but in no case less than 1.5 inches or less than 1-1/2 times the maximum size aggregate.
  5. Splices shall be in accordance with the following:
    - a. Maximum 50 percent of steel spliced occurring within lap length.
    - b. Splice lengths: #6 bars and smaller – 30 bar diameter.
  6. Protective Concrete Covering
    - a. Except where shown otherwise on Contract Documents, the minimum concrete coverage for steel reinforcement shall conform to the applicable revisions of the "Codes and Standards" previously specified in this Section. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
  7. Dowels and Sleeves
    - a. Install expansion dowels and sleeves perpendicular to and across expansion joints in concrete at 2 feet, 0 inches on center minimum, or as shown on the Contract Documents. Core drill existing concrete where required and grout

non-sleeved end of dowel in place. After grout has set, bend dowel and sleeve as required to level before pouring new concrete.

- B. Do not bend, tack weld or cut reinforcement in field in any manner other than as shown on Contract Documents unless specific approval for each case is given by Owner's Representative.
- C. Continue reinforcement through construction joints unless otherwise indicated on Contract Documents.
- D. Splice reinforcement only in accordance with requirements of Contract Documents or as otherwise specifically approved by Owner's Representative. Do not splice reinforcement at points of maximum stress unless shown on the Contract Documents.
- E. Clean reinforcement of loose rust and mill scale. Paint reinforcement expected to be exposed to weather for a considerable length of time with a heavy coat of cement grout. Protect stored materials so as not to bend or distort bars in any way. Bars that become damaged will be rejected.
- F. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by the Owner's Representative.
- G. Install welded wire fabric in lengths as long as practicable Lap adjoining pieces by 12 inches and as indicated and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- H. Before concrete is cast, check all reinforcement after it is placed to insure that reinforcement conforms to Contract Documents and approved Shop Drawings. Such checking shall be done only by qualified experienced personnel. In addition, notify the Owner's Representative at least 36 hours prior to concrete placement so a visit may be made to observe completed reinforcement and formwork before concrete placement.

### 3.03 PREPARING FORM SURFACES

- A. General: Coat contact surfaces for forms with an approved form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
  - 1. Coat steel forms with a non-staining, rust-preventative material. Rust-stained steel formwork is not acceptable.

### 3.04 EMBEDDED STEEL ITEMS

- A. Embedded steel items shall be as specified and located as shown on the drawings. They shall be adequately secured prior to placement of any concrete.

### 3.05 CONCRETE PLACEMENT

- A. Inspection Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.
- C. If concrete pumping is proposed, refer to "Submittals" paragraph in this Section for requirements. Concrete may be placed into the pump at the maximum but not more than the specified slump.
- D. Remove water and foreign matter from forms and excavations and, except in the freezing weather or as otherwise directed, thoroughly soak wood forms just prior to placing concrete. Place no concrete on frozen substrate, and provide adequate protection against frost action during freezing weather.
- E. To secure bond at construction joints, thoroughly clean concrete surfaces with water jet or compressed air. Just before new concrete is deposited, saturate joint surface with water for not less than 2 hours, leaving surface without free or glistening water.
- F. Do not place concrete having slump outside of allowable slump range. The loss of slump between pump and discharge end of pipeline shall not exceed 2 inches.
- G. Transport concrete from mixer to place of final deposit as rapidly as practical by methods which prevent separation of ingredients and displacement of reinforcement, and which avoid rehandling. Deposit no partially hardened concrete. When concrete is conveyed by chutes, equipment shall be of such size and V-shaped design as to insure continuous flow in chute. Do not use flat (coal) chutes. Use metal or metal-lined chutes with different portions having approximately the same slope. Slope shall not be less than 25 degrees nor more than 45 degrees from horizontal. Use a baffle or spout at the discharge end of the chute to prevent segregation. If discharge end of chute is more than 5 feet above surface of concrete in forms, use spout with its lower end at surface of deposit. When operation is intermittent, discharge chute into hopper. Do not allow concrete to flow horizontally over distances exceeding 5 feet.
- H. Place concrete in such manner as to prevent segregation and accumulations of hardened concrete on forms or reinforcement above mass of concrete being placed. To achieve this end, use suitable hoppers, spouts with restricted outlets and tremies as required.
- I. During and immediately after depositing, compact concrete in accordance with ACI 309 by means of internal type mechanical vibrators or other tools to produce required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be performed only enough to produce homogeneity and optimum consolidation without permitting segregation of constituents or 'pumping' of air. Vibrators used for normal weight concrete shall operate at speed of not less than 7,000 rpm and be of suitable capacity. Do not use vibrators to move concrete. Keep at least one vibrator on hand for every 10 cubic yards of concrete placed per hour, plus one spare. Vibrators shall be operable and on site prior to starting placement.
- J. Place vertical lifts to not exceed 18 inches. Vibrate through successive lifts to avoid pour

lines. Vibrate first lift thoroughly until top of lift glistens to avoid stone pockets, honeycomb, and segregation.

- K. Deposit concrete continuously, and in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause formation of seams and planes of weakness within section. If section cannot be placed continuously between planned construction joints, as specified, introduce a joint and additional reinforcement so as to preserve structural continuity. Notify Owner's Representative in any such case.
- L. Cold joints, particularly in exposed concrete, including "honeycomb", are unacceptable. If they occur, Owner's Representative may require the entire section in which such defect occurs be removed and replaced with new materials at Contractor's expense.
- M. Clean chutes, hoppers, spouts, adjacent work, etc. before and after each run; discharge water and debris outside form.
- N. Temperature of the concrete mix should be between 50 degrees Fahrenheit and 85 degrees Fahrenheit and it should not vary more than approximately 10 degrees Fahrenheit from the temperature of the concrete against which it is placed.
- O. Cold-weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- P. When air temperature has fallen to or is expected to fall below 40 degrees Fahrenheit, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees Fahrenheit and not more than 80 degrees Fahrenheit at point of placement.
  - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen sub grade or on sub grade containing frozen materials.
  - 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
  - 3. Concrete and formwork must be kept at a temperature of not less than 50 degrees Fahrenheit for not less than 96 hours after placing.
- Q. Hot-weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
  - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 85 degrees Fahrenheit. Mixing water may be chilled or chipped 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. No concrete shall be deposited when the air temperature is greater than 90 degrees Fahrenheit.
  - 3. Cover reinforcing steel with water-soaked burlap, if it becomes too hot, so that

steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

4. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
5. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to the Owner's Representative.

### 3.06 JOINTS

- A. Contraction Joints: Contraction joints shall be spaced so that monolithic sections between returns will not be less than 5 feet nor greater than 15 feet in length, unless shown otherwise on the Contract Drawings. Contraction joints shall be constructed by means of 1/8 inch thick separators and of a section conforming to the cross section of the curb and gutter, edging and overside drain, or to the cross section of the retaining wall. Contraction joints in the retaining wall may also be constructed by placing wall monoliths in alternate patterns. Longitudinal reinforcing steel shall extend through construction joints in the retaining wall. Separators shall be removed as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing.
- B. Expansion Joints: Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter, edging, and overside drain, or to the cross section of the retaining wall. Expansion joints at least 1/2 inch width shall be provided at intervals not less than 30 feet or greater than 120 feet, unless shown otherwise on the Contract Drawings. Longitudinal reinforcing steel shall not extend through expansion joints in the retaining wall. Expansion joints shall be sealed immediately following curing of the concrete or as soon thereafter as weather conditions permit.

### 3.07 FINISHED FORMED SURFACES

- A. Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. Floated surfaces shall then be brushed with a fine-hair brush with longitudinal strokes.
  1. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The front curb surface, while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float.

### 3.08 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Where corrosion inhibitor admixture has been used, provide continuous waterfog spray or mist or evaporation retardant to prevent plastic shrinkage cracks during initial setting time. In hot, dry and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply



according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
- D. Provide moisture curing by the following methods:
  - 1. Keep concrete surface continuously wet by covering with water.
  - 2. Use continuous water-fog spray.
  - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
  - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on curb and gutter, edging, and overside drain as follows:
  - 1. Apply curing compound as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

### 3.09 SHORES AND SUPPORTS

- A. General: Comply with ACI 347 for shoring, as specified.
- B. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

### 3.10 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete may be removed after cumulatively curing at not less than 50 degrees Fahrenheit for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal

operations, and provided curing and protection operations are maintained.

- B. Formwork supporting weight of concrete may not be removed in less than 14 days or until concrete has attained at least 75 percent of its specified 28-day minimum compressive strength. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

### 3.11 REUSING FORMS

- A. 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 concrete surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure Joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to the Owner's Representative.

### 3.12 CONCRETE SURFACE REPAIRS

- A. Intent of this Specification is to require forms, mixtures or concrete, and workmanship to be of the very best quality so that final, stripped concrete surfaces will require no patching, except for plugging of tie holes.
- B. Clean and dampen tie holes and fill solid with patching mortar immediately after form removal.
- C. Patching Defective Areas: Patch and repair defective areas, as specified, only after examination and approval by the Owner's Representative. Repair and patch as soon as possible after removing forms, in compliance with ACI 301, Chapter 9, and as specified in this Section.
- D. Mix dry-pack mortar, consisting of one part Portland Cement to 2 ½ parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
  - 1. Cut out honeycombs, rock pockets, voids over 0.25 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. If honeycomb exists around reinforcement, chip to provide clear space at least 0.75 inch wide all around steel to ensure proper bond thereto. Thoroughly clean, dampen with water, and brush-coat the area to be patched with epoxy adhesive. Place patching mortar before epoxy adhesive has dried. Repairs thicker than 1.5 inches shall be built-up on successive days, each layer of 1.5 inches being applied as described in ACI 301, Chapter 9.
  - 2. Remove and replace patches that become crazed, cracked, or sound hollow upon

tapping, at Contractor's expense.

- E. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of the Owner's Representative. 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. Flush out form tie holes and fill with dry-pack mortar.
  - 1. Repair concealed formed surfaces containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
  
- F. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
  - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
  - 2. Correct high areas in unformed surfaces by grinding after cure of at least 14 days.
  - 3. Correct low areas in unformed surfaces 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. Proprietary underlayment compounds may be used subject to the approval of the Owner's Representative.
  - 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 0.75-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  
- G. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for at least 72 hours.
  
- H. Repair methods not specified above may be used, subject to acceptance of the Owner's Representative.

### 3.13 DISPOSAL OF CONCRETE WASH OUT MATERIAL

- A. Contractor shall be responsible for the removal of all truck washout concrete material

deposited on site. Burial of concrete washout material on site is not permitted.

### 3.14 ACCEPTANCE STANDARDS

- A. The following concrete work shall be considered defective and may be ordered by the Owner to be removed and replaced at Contractor's expense:
1. Incorrectly formed.
  2. Not plumb or level.
  3. Not specified strength.
  4. Containing rock pockets, voids, honeycomb, or cold joints.
  5. Containing wood or foreign matter.
  6. Surface texture does not conform to the requirements of the Contract Documents.
  7. Otherwise not in accordance with the intent of the Contract Documents.

END OF SECTION 03300

## SECTION 05500

### MISCELLANEOUS METALS

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. This Section includes the following:
  - 1. Furnishing, installing, and testing all miscellaneous metalwork and appurtenances complete in accordance with the Contract Documents.

##### 1.02 RELATED TECHNICAL SECTIONS

- A. Section 02630, STORMWATER FACILITIES
- B. Section 03300, CAST-IN-PLACE CONCRETE

##### 1.03 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – SUBMITTALS:
  - 1. Show Drawings of all miscellaneous metalwork used in the work showing materials, sizes, finishes, locations, attached hardware and fittings, and details for manufactured items and fabricated metalwork, including grating span charts, field erection details showing cuts, copes, connections, holds, thread fasteners and welds. Indicate welds, both shop and field, by symbols conforming to AWS standards. Indicate coatings or other protection against corrosion.
  - 2. Manufacturer's literature describing standard items.
  - 3. Setting diagrams, erection plans, templates and directions for installing of backing plates and anchors.
  - 4. Statement stating that all materials, finishes and load requirements conform to the Contract Documents.
  - 5. Anchor Submittals
    - a. Submit an ICC-ES or IAPMO-UES report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor.

- b. Submit an ICC-ES or IAPMO-UES report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor.
- c. Upon review by the ENGINEER, these instructions shall be followed Specifically.
- d. No substitution for the indicated anchors will be considered unless accompanied with an ICC-ES or IAPMO-UES report verifying strength and material equivalency.
- e. Complete structural calculations and anchorage details shall be prepared and submitted by the Contractor for all anchors and anchor groups that are shown but not completely detailed (type, size, location, spacing and embedment) on the Contract Documents. Calculations and anchorage details shall be signed and stamped by a Professional Engineer registered in the state in which the project is located.

#### 1.04 QUALITY CONTROL

- A. Provide in accordance with Section 01400 – QUALITY CONTROL and as specified
  - 1. Welders Qualifications: All weld procedures and welder qualifications shall be available in the Contractor’s field office for the Owner’s review.
  - 2. All welding shall be inspected by a Contractor-provided inspector qualified in accordance with AWS requirements and approved by the Owner.

### PART 2 – PRODUCTS

#### 2.01 GENERAL REQUIREMENTS

- A. Steel:
  - 1. Wide Flange Shapes: ASTM A992
  - 2. Shapes, Plates, Bars: ASTM A36
  - 3. Pipe, Pipe Columns: ASTM A 53, Type E or S, Grade B Standard weight unless noted otherwise
  - 4. Tubes: ASTM A 500 Grade B
  - 5. Unless otherwise indicated, miscellaneous metalwork of fabricated steel, which will be submerged shall be hot-dip galvanized after fabrication. All other

miscellaneous steel metalwork shall be coated or protected from corrosion with a specified protective coating.

B. Stainless Steel:

1. Unless otherwise indicated, stainless steel metalwork and bolts shall be of Type 316 stainless steel and shall not be galvanized.
2. Shapes and Bars: ASTM S276
3. Type (or Grade) 316L for Welding

C. Aluminum: Unless otherwise indicated, aluminum metalwork shall be of Alloy 6061-T6. Aluminum in contact with concrete, masonry, wood, porous materials, or dissimilar metals shall have coated contact surfaces.

D. Cast Iron: Unless otherwise indicated, iron castings shall conform to the requirements of ASTM A 48, Class 50B or better.

## 2.02 IRON CASTINGS

A. Iron castings shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage, distortion, or other defects. They shall be smooth and well cleaned by shotblasting.

B. Covers shall fit within their respective frames so that the cover fits flush with the surrounding finish surface and so that the cover does not rock or rattle when loading is applied. Covers and frames shall have machined bearing surfaces.

C. Covers with matching frames shall be designed to support the following loadings:

1. Where located within a structure, the design loading shall match that required for the adjacent floor area, or, if no loading is given, a minimum of 300 pounds per square foot, unless indicated otherwise.
2. Exterior covers and grates shall be designed for AASHTO HS20 loading unless indicated otherwise.

## 2.03 BAR GRATES

A. Provide bar grates as indicated and fabricated from hot dipped galvanized steel shapes and bars. Welded joints shall be ground smooth. Allow for gasketing and hardware as indicated.

## 2.04 BOLTS AND ANCHORS

- A. Corrosive Service: All bolts, nuts, and washers shall be Type 316 stainless steel for all areas indicated below.
1. All buried locations.
  2. All submerged locations.
  3. All locations subject to seasonal or occasional flooding.
  4. Inside hydraulic structures below the top of the structure.
  5. Inside buried vaults, manholes, and structures which do not drain through a gravity sewer or to a sump with a pump.
  6. All locations subject to continuous or intermittent wetting or spraying other than weather.
  7. All locations indicated by the Contract Documents or designated by the Owner to be provided with stainless steel bolts.
- B. Non-Corrosive Service: All bolts nuts and washers used in locations not identified in Paragraph 2.4.A, shall satisfy the following.
1. All bolts, anchor bolts, nuts, and washers shall be Type 304 stainless steel, class 2, conforming to ASTM A 193 for bolts and to ASTM A194 for nuts.
- C. Bolt Requirements:
1. The bolt and nut material shall be free-cutting steel.
  2. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.
  3. All bolts and nuts shall be installed with washers fabricated of material matching the base material of bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers shall be



installed with washers where indicated and shall be fabricated of material matching the bolts.

4. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case more than 1/2-inch beyond the nut.
  5. All threads on stainless steel bolts shall be protected with an anti-seize lubricant, shall be classified as acceptable for potable water use by NSF and suitable for submerged stainless steel bolts, to meet government specification MIL-A-907E.
  6. Buried bolts in poorly drained soil shall be coated the same as the buried pipe.
- D. Adhesive Anchors: Unless otherwise indicated, all drilled, concrete or masonry anchors shall be adhesive anchors. Any substitutions must be accompanied by an ICC-ES or IAPMP-UES report verifying strength and material equivalency.
1. Epoxy adhesive anchors are required for drilled anchors where exposed to weather, in submerged, wet, splash, overhead, and corrosive conditions, and for anchoring pumps and other equipment. Epoxy anchor grout shall comply with Section 03315 – GROUT. Threaded rod shall be Type 316 stainless steel.
- E. Expanding-Type Anchors: Expanding-type anchors, if indicated or permitted, shall be steel expansion type (lead caulking anchors will not be permitted) and the size indicated. Expansion type anchors which are to be embedded in grout may be steel. Non-embedded, buried, or submerged anchors shall be stainless steel. Expanding-type anchors shall be similar to a style typified by Kwik Bolt TZ by Hilti Corporation, Strong-Tie Strong Bolt 2 by Simpson, Power-Stud+SD1 by Powers or an approved equal.

## PART 3 – EXECUTION

### 3.01 FABRICATION AND INSTALLATION REQUIREMENTS

- A. Fabrication and Erection: Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."

### 3.02 WELDING

- A. Method: All welding shall be by the metal-arc method or gas-shielded arc method as described in the American Welding Society's "Welding Handbook" as supplemented by

other pertinent standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards governing same.

- B. Quality: In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall be as indicated by the AWS Code. Upon completion of welding, all weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions. All sharp corners of material which is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.

### 3.03 GALVANIZING

- A. All structural steel plates shapes, bars and fabricated assemblies required to be galvanized shall, after the steel has been thoroughly cleaned of rust and scale, be galvanized in accordance with the requirements of ASTM A 123. Any galvanized part that becomes warped during the galvanizing operation shall be straightened. Bolts, anchor bolts, nuts and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A 153.

### 3.04 DRILLED ANCHORS

- A. Drilled anchors and reinforcing bars shall be installed in strict accordance with the manufacturer's instructions. Holes shall be roughened with a brush on a power drill, cleaned and dry. Drilled anchors shall not be installed until the concrete has reached the specified 28-day compressive strength. Adhesive anchors shall not be loaded until the adhesive has reached its indicated strength in accordance with the manufacturer's instructions.
- B. Existing reinforcing steel in the vicinity of proposed holes shall be located prior to drilling. The location of holes shall be adjusted to avoid drilling through or cutting any existing reinforcing bars.
- C. All abandoned drilled holes shall be filled with Epoxy Anchor Grout.

END OF SECTION 05500

## SECTION 06100

### ROUGH CARPENTRY

#### PART 1 GENERAL

##### 1.01 SUMMARY

- B. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to complete the construction of but not limited to the following:

6. Boardwalk retrofit construction.
7. Pedestrian Bridge decking and railing construction.
8. Pedestrian Bridge sanding and staining.

##### 1.02 RELATED WORK

- B. The following items of related work are specified and included in other Sections of the Specifications:

11. Section 02772, GRANITE CURB
12. Section 02800, SITE IMPROVEMENTS
13. Section 03300, CAST-IN-PLACE CONCRETE

##### 1.03 REFERENCES

- A. American Plywood Association (APA):
1. AFG-01, Adhesives for Field-Gluing Plywood to Wood Framing.
  2. PRP-108, Performance Standards and Policies for Structural-Use Panels.
- B. American Society for Testing and Materials (ASTM):
1. A307 Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

2. E84, Surface Burning Characteristics of Building Materials.
  3. E96, Water Vapor Transmission Materials.
- C. Architectural Woodwork Institute (AWI: 02, Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program.
  - D. National Fire Protection Association (NFPA: 255, Method of Test of Surface Burning Characteristics of Building Materials.
  - E. National Forest Products Association (NFOPA: 01, National Design Specification for Wood.
  - F. Southern Pine Inspection Bureau (SPIB: 1001, Grading Rules.
  - G. Underwriters' Laboratories, Inc. (UL): 723, Surface Burning Characteristics of Building Materials.
  - H. U.S. Department of Commerce-Product Standards (PS:
    1. PS 1, Construction and Industrial Plywood.
    2. PS 20, American Softwood Lumber.
  - I. Western Wood Products Association (WWPA: 01, Western Lumber Grading Rules.

#### 1.04 SUBMITTALS

- A. At least thirty (30) days prior to intended use, the Contractor shall provide the following samples and submittals for approval. Do not order materials until Owner's Representative's approval of samples, certifications and/or test results has been obtained. Delivered materials shall closely match the approved samples. Samples and approvals which are not obtained prior to the ordering of materials or the completion of work, shall result in possible disapproval of obtained materials or completed work.
- B. Manufacturer's Literature: Submit one electronic copy of each manufacturer's material descriptions and/or installation instructions for each of the following:
  1. All pressure treated lumber, fasteners, hangers and hardware.
  2. Copper Naphthenate preservative for pressure treated sealing.
  3. Wood stain (pedestrian bridge): Submit manufacturer's name, product name and product number for each material as well as product data including range of standard colors.
- C. Manufacturer's certificates:

1. Material certificates for dimensional lumber in compliance with allowable unit stresses. Show species and grade selected for each use as well as design values approved by the American Lumber Standards Committee's (ALSC) Board of Review.
2. For each type of pressure treatment specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained and conformance with applicable standards.
3. For water-borne preservatives, include statement that moisture content of treated materials was reduced to a maximum of 15% prior to shipment to project site.
4. For wood stain, include statement product is a oil-based stain intended for exterior wood applications.

D. Shop Drawings:

Submit detailed Shop Drawings for each item required to be fabricated or installed under this Section. Include plans, sections and details as required to show all materials, layout, dimensions, jointing and connections for all items required. Shop drawings required are as follows:

1. Boardwalk Retrofit Design (indicate and include layout information all footings, lumber, materials, hardware and fasteners).
2. Bridge Repair (indicate and include layout information all footings, lumber, materials, hardware and fasteners).

Take measurements and verify dimensions at site before submitting Shop Drawings and constructing samples.

E. Material Sample:

2. Pressure treated wood samples for all wood items.
3. All decking hardware, hangers and fasteners.
4. Pressure treated wood stained sample (for pedestrian bridge).

F. Constructed Samples to be approved in field:

1. Boardwalk Retrofit: Framing, decking and post – with connections
2. Bridge Repair: Railing and decking connections

## 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Immediately upon delivery to site, place materials in area protected from weather.
- B. Protect sheet materials from breaking corners and damaging while unloading.
- C. Store materials a minimum of 6 inches aboveground on framework or blocking and cover with waterproof covering providing for adequate air circulation or ventilation. Store sheet materials flat, not on edge.
- D. Do not store seasoned materials in wet or damp areas.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. Lumber Standards: Furnish lumber manufactured in accordance with PS 20 and with applicable grading rules certified by American Lumber Standards Committee's (ALSC) Board of Review. Stamp or brand each piece of lumber with the grade, species, moisture content at time of mill surfacing.
  - 1. Lumber grading rules and wood species in conformance with PS 20 and NFOPA 01. Design values for wood members equal to those published in the "Design Values for Wood Construction," a supplement to the 1982 edition of National Design Specification for Wood Construction, published by the National Forests Products Association.
  - 2. Furnish exposed lumber pieces with grade stamps applied to ends or back of each piece of treated lumber.
- B. Lumber sizes shown on Drawings are nominal, unless shown otherwise. Provide actual sizes as required by PS 20 for use.
- C. Dressed lumber S4S unless shown otherwise on Drawings.
- D. Moisture content of lumber not to exceed 19 percent unless otherwise specified.
- G. Sealing compound for treatment of field cuts and drilled holes shall be two coats of Copper Naphthenate meeting AWWPA Standard P8.

### 2.02 LUMBER

- A. Wood shall be pressure treated southern yellow pine uniform in treatment and appearance, sizes as noted on the Drawings. All wood shall be from a single source.
1. Grade Certification: Each piece of wood shall bear grade mark applicable in accordance with the latest edition of Rules and Southern Pine Inspection Bureau or certified as to grade by a licensed subscriber or SPIB.
  2. Grade: Grade shall conform to Southern Pine SPIB Standards, latest edition, and in conformance with the following size and use applications:

SPIB Minimum

<u>Use Category</u>	<u>Grade</u>
Rails and Rail posts	No. 1
Beams, Joists and blocking of boardwalk and overlook	No. 2

2. Moisture Content: Wood shall be air dried for 90-120 days to the maximum moisture content specified below to prevent excessive surface checking prior to preservative treatment.
  - a. Timber larger than (2x) nominal dimension: 25% maximum moisture content.
  - b. Wood (2x) nominal thickness dimension and smaller: 19% maximum moisture content.

2.03 PRESERVATIVE TREATED WOOD

- A. Preservative Treatment: Where lumber or plywood is indicated as "Trt-Wd" or "Treated," or is specified herein to be treated, comply with applicable requirements of AWPB Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.
1. Pressure-treat above-ground items with water-borne preservatives complying with AWPB LP\_-2. After treatment, kiln-dry to a maximum moisture content of 15%. Treat indicated items and the following:
    - a. Wood cants, nailers, curbs, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
  2. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

2.04 HARDWARE

- A. Bolts and Screws: Conforming to ASTM A307, galvanized where exposed.
- B. Framing Anchors, Joist, and Beam Hangers: Simpson, Teco, or Bowman galvanized minimum 18-gauge steel, complete with nails.
- C. Ply Clips: Extruded 6063-T6 aluminum alloy.
- D. Adhesives: Elastomeric glue conforming with APA Performance Specification AFG-01.

#### 2.05 FASTENERS

- A. Unless otherwise noted, all bolts required by the drawings shall be carriage bolts. Each bolt shall have one washer and one nut.
- B. All nails shall be stainless steel ring-shank nails. All nails and spikes shall conform to Federal Specification FF-N-105B.
- C. All screws for securing decking shall be stainless steel decking screws with hex head.

#### 2.06 WOOD STAIN (PEDESTRIAN BRIDGE)

- A. Wood stain shall be oil-based stain for exterior applications. Stain shall be water-repellent and fade resistant.
- B. Acceptable products include:
  - a. PPG ProLuxe Solid Wood Stain
  - b. Olympic Elite Advanced Stain and Sealant
  - c. Or approved equal.

### PART 3 - EXECUTION

#### 3.01 GENERAL

- A. Lay out, cut, fit, and install all rough carpentry items. Anchor sufficiently to ensure rigidity and permanence.
- B. Install items accurate to dimension, true to line, level, and square unless shown otherwise on Drawings. Provide for installation and support of other Work.
- C. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- D. Countersink nail heads on exposed carpentry work and fill holes.



### 3.02 EXAMINATION

- A. Verify that surfaces to receive rough carpentry materials are prepared to exact grades and dimensions.

### 3.03 INSTALLATION

- A. All footings for boardwalk retrofit shall conform with Section 03300, CAST-IN-PLACE CONCRETE.
- B. Construct all wood items in accordance with the approved Shop Drawings and Mock-Ups or as directed by the Owner's Representative.
- C. Boardwalk and bridge decking shall be of one continuous piece; no joints will be allowed. Lumber shall be parallel cut without heart center or sap wood and shall be straight grained, maximum slope of grain to be 1:10. All milled surfaces shall be sanded smooth on all four sides and both ends after being worked to the required dimensions.
- D. Provide pre-bored holes 1/16" larger than bolts for all bolts. Provide pre-bored lead holes 1/16" larger than screws for all screws.
- E. Wood cutting and jointing shall be workmanlike, square and true. No split or blistered wood pieces will be allowed. All joints shall be neat, tight, and square.
- F. All wood shall receive specified pressure treatment. Any cuts made in field shall be treated as specified herein.
- G. Treat all field cuts, drills and injuries with copper-naphthenate solution by soaking and brushing. Copper-naphthenate solution shall have minimum concentration 2% copper metal. Two coatings are required.
- H. Observe all handling, transportation, and storage instructions for pressure treated wood provided by the supplier. Use Copper-naphthenate solution only in accordance with supplier's instructions.

### 3.04 PEDESTRIAN BRIDGE PREPARATION AND STAINING

- A. Contractor shall receive approval on stain and color from Owner's Representative prior to procuring materials and commencing application.
- B. Prior to staining, all wood surfaces shall be pressure washed and cleaned of any organic materials, loose wood fibers and any other foreign matter. Rough surfaces shall be sanded smooth. Existing deteriorating wood surfaces shall be sanded smooth and prepared with a wood cleaner such as cabot problem-solver wood cleaner or approved equal and scrubbed with a stiff bristled brush.
- C. Protect surrounding surfaces adequately prior to commencing stain application.

- D. Outdoor Temperature and Conditions: Air and surface temperature shall be between 50 degrees Fahrenheit and 90 degrees Fahrenheit. Surfaces shall be dry within limits of finish system manufacturer. Do not paint exterior surfaces while surfaces are exposed to the hot sun.
- E. Prior to stain application wood surface must be completely dry and exposed to dry weather 3 to 5 days minimum.
- F. Stain application method shall be with a natural bristle brush or professional spray equipment. Paint applied by spraying shall be back brushed immediately. All mixing, storage, thinning shall be accomplished in strict accordance with the manufacturer's instructions. Two coats shall be applied.
- G. There shall be no color variation between stained items. Finished work shall be free from runs, sags, hairs, defective brushing, and clogging of lines and angles. Flaws visible in the completed work shall be removed and the area satisfactorily repaired.
- H. Completed Work: Provide finishes that match approved samples and mock-ups for color, texture, and coverage, remove, refinish, or repaint work not in compliance with specified requirements. Owner's Representative will conduct final inspection of work. Areas that do not comply with requirements of these Specifications shall be repainted or retouched to satisfaction of Owner's Representative at no additional cost to Owner.
- I. Cleaning: At completion of work remove all material, equipment and debris. Leave finished work in a clean satisfactory condition.

END OF SECTION 06100

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APPENDIX 01060-A

