CONTRACT DOCUMENTS

Codjer Lane and Horse Pond Road
Water Main Improvements
Sudbury, MA

CONTRACT SWD 19-13

Prepared For

Sudbury Water District
Sudbury, MA

COMMONWEALTH OF MASSACHUSETTS
PAUL C. MILLETT
CIVIL
No. 37250
REGISTERED PROFESSIONAL ENGINEER
3/4/19

March 2019

Environmental Partners GROUP

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BIDDING AND CONTRACT REQUIREMENTS

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Sudbury Water District

199 Raymond Road • P.O. Box 111 • Sudbury • Massachusetts 01776
Ph. 978-443-6602 • fax 978-443-9587 • sudburywater.com

INVITATION FOR BIDS

IFB 19-13

Codjer Lane and Horse Pond Road Water Main Improvements

Release Date: Thursday, March 7, 2019

Bid Opening
2:10 PM Thursday, March 28, 2019
Deadline for Questions
2:00 PM Thursday, March 21, 2019

(Advertised in Central Register 3/7/2019)
(Advertised in MetroWest Daily News 3/7/2019)

LEGAL NOTICE

Sudbury Water District
Invitation for Bids
19-13
Codjer Lane and Horse Pond Road Water Main Improvements

The Sudbury Water District is accepting sealed bids for **Codjer Lane and Horse Pond Road Water Main Improvements Project.** All bids are subject to the provisions of **M.G.L. Chapter 30/39M**. Copies of the Invitation for Bids (IFB) package will be available beginning Thursday, March 7, 2019 online at the District's web site http://www.sudburywater.com and will be available until submission deadline.

Please refer to the IFB for additional information. Sealed bids proposals must be **submitted no later than 2:00 P.M. Thursday, March 28, 2019** to Vincent Roy, Executive Director, Sudbury Water District Office, P.O. Box 111, and 345 Boston Post Road, Suite A, Sudbury Massachusetts 01776. Bids will be opened and read aloud on **March 28, 2018, at 2:10 P.M. EST** in the Sudbury Water District Office, 345 Boston Post Road, Sudbury Massachusetts 01776.

LATE BIDS WILL NOT BE CONSIDERED. The Sudbury Water District reserves the right to reject any and all bids as determined to be in the best interests of the District and to waive minor informalities.

Vincent J. Roy
Executive Director
March 7, 2019

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Contract Requirements	
Bid Deposit	Will be Required
Payment Bond	Will be Required
Performance Bond	Will be Required
Insurance	Refer to Contract Terms.

* Facsimile transmissions for written inquiries must be sent prior to the above date and time deadlines. Any hand delivery or facsimile received after the due date and time will not be addressed. The time/date stamp machine located in the receiving office will govern for the date and time requirements mentioned in the table above and throughout this document. Please allow enough time for hand delivery or facsimile transmissions.
** The time for award may be extended by the DISTRICT. The DISTRICT reserves the right to change, delay, cancel, or expedite the contract award date. The Bidder agrees that the offer is effective for (a) at least sixty (60) calendar days from the opening date of the bids (b) a contract is executed, or (c) this bid is cancelled, whichever of (a), (b) or (C) occurs first. **The District reserves the right to reject any and all bids as determined to be in the best interests of the District and to waive minor informalities. The District reserves the right to award the Contract based on sufficiency of appropriated funds to complete the work.**

SECTION 1

STANDARD INSTRUCTIONS TO BIDDERS

1.1. INTRODUCTION

The Sudbury Water District is soliciting bids for the above named project. All bids are subject to the provisions of **M.G.L. Chapter 30/39M**. Copies These Standard Instructions to Bidders are a part of the bid package for the **Codjer Lane and Horse Pond Road Water Main Improvements Project** for the Sudbury Water District in the Town of Sudbury, with construction beginning around July 1, 2019 and completed around September 30, 2019. If there are any conflicts between the instructions in these Standard Instructions to Bidders and any other bidding document(s), these Standard Instructions to Bidders shall prevail.

1.2. KEY EVENT DATES

• Invitation to Bid Issued		March 7, 2019
• Pre-Bid Conference		Not Applicable
• Deadline for Written Questions	2:00 PM	March 21, 2019
• Deadline for Submitting Bids	2:00 PM	March 28, 2019
• Public Bid Opening	2:10 PM	March 28, 2019
• Bid Awarded (Anticipated)		April 5, 2019
• Commencement of Work		Notice to Proceed
• Completion Date		As required

1.3. OBTAINING BID DOCUMENTS

Specifications and bidding documents may be obtained from the Sudbury Water District Office website at: https://www.sudburywater.com/bid-specs/

1.4. BID SUBMISSION INSTRUCTIONS

A. One (1) original and one (1) copy of all bids must be submitted in a sealed envelope clearly marked **"Codjer Lane and Horse Pond Road Water Main Improvements Project"**. If forwarded by mail or courier, the sealed envelope must be addressed to "Vincent Roy, Executive Director, Sudbury Water District, and 345 Boston Post Road, Sudbury, MA 01776". Bids must be at the Sudbury Water District office of the prior to the time the first bid is scheduled to be publicly opened. Postmarks are NOT an acceptable waiver of this policy. Corrections and/or modifications received after the scheduled date and time for opening will NOT be accepted. Bids may not be submitted by facsimile or email.

B. Ditto marks or words such as "SAME" on the Bid will be considered writing and must not be used.

C. All information must be submitted in blue ink or typewritten. Mistakes may be crossed out and corrections inserted. Corrections must be initialed by the person signing the bid.

D. Bids are considered valid for sixty (60) days after bid(s) are opened. Bidders may not withdraw, cancel or modify their bid for a period of sixty (60) days after bid(s) are opened.

E. Bids must be signed by an authorized person representing the legal entity of the bidder.

F. The inability to meet any specified requirement(s) must be stated in writing and attached to the bid form, or written on the bid form.

1.5. QUESTIONS

Any questions on this project should be directed to Mr. Vincent Roy, Executive Director at (978) 443-6602. However, no oral interpretations shall be made to any respondent as to the meaning of any of the bid documents. Every request for an interpretation shall be made in writing, addressed and forwarded to Vincent Roy either by email to kmorretti@sudburywater.com, fax: (978) 443-9587, or by mail: Sudbury Water District, P.O. Box 111, Sudbury, MA 01776. To receive consideration, such questions must be received at least five (5) business days before the established date for receipt of bids.

The District will arrange an addendum, which shall be made a part of this Invitation to Bid and the resulting agreement, all questions received as above provided and decisions regarding each. At least three (3) days prior to the receipt of bids, the District will post a copy of any addenda to its website, located at: https://www.sudburywater.com/bid-specs/. It shall be the responsibility of each bidder to determine whether addenda have been issued, and if so, to download copies directly from the District's website.

1.6. PRESUMPTION OF BIDDER BEING FULLY INFORMED

At the time the first bid is opened, each bidder is presumed to have read and is thoroughly familiar with all bidding and contract documents for this project and have visited the project site. Failure or omission of the bidder to receive or examine any information concerning this bid shall in no way relieve any bidder from obligations with respect to their bid.

1.7. PRE-BID CONFERENCE

Attendance at the pre-bid conference, if any as indicated in Section 1.2, titled Key Event Dates, is **not** mandatory on this project. Failure to attend does not relieve bidders of obligations under this bid.

1.8. TAX EXEMPTIONS

The Sudbury Water District is exempt from Federal Excise Taxes and Massachusetts Sales and Use Taxes. Bidders shall avail themselves of these exemptions.

1.9. AWARDING THE BID

The DISTRICT will award the contract to the lowest responsive and responsible bidder. The Sudbury Water District reserves the right to accept any bid or any part of bids, to reject any, all, or any part of bids, to waive any formalities or informalities in the bidding process, and to award the bid deemed to be in the best interests of the District. The Sudbury Water District will enter into a written agreement with the selected vendor. The "Bid Awarded" date in Section 1.2, titled Key Event Dates, is the date the bid is anticipated to be awarded. It is not a date certain.

The lowest priced bid is NOT the sole determining factor when awarding this bid and the District reserves the right to negotiate with the bidder that is preliminarily selected. In the event of a tie bid, the Bid that is received by the Sudbury Water District earliest in time shall be awarded the contract. The contract award is subject to the appropriation of funds at the May 21, 2019 Annual District Meeting and the approval of the Water Commissioners as recommended by the Executive Director.

1.10. BID BOND

All bids must be accompanied by a bid deposit in an amount not less than five (5) percent of the total value of the proposed work. Bid deposits shall be made payable to the "Sudbury Water District" and shall be in the form of cash, certified check, treasurer's or cashier's check issued by a responsible bank or trust company, or a bid bond issued by a surety licensed to do business in the Commonwealth of Massachusetts; and shall be conditioned upon the faithful performance by the principal of the agreements contained in the bid.

1.11. PERFORMANCE BOND

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

1.12. LABOR & MATERIALS BOND (PAYMENT BOND):

The contractor shall furnish a payment bond from a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and satisfactory to the District, in an amount of the total contract price for payment for labor performed or furnished and materials used or employed therein, when the contract is executed.

It is distinctly agreed and understood that any changes made in the specifications for this work, whether such changes increase or decrease the amount of work required, or any change in the manner or time of payments made by the District to the contractor, shall in no way void, release or affect the liability and surety on the bond given by the contractor.

1.13. INSURANCE REQUIREMENTS

Insurance coverage is required in accordance with the following:

1) The contractor shall, at its own expense, obtain and maintain general liability and motor vehicle liability insurance policies protecting the District in connection with any operations included in the contract, and shall have the District named as an additional insured on the policies. General liability coverage shall be in the amount of at least $1,000,000 per occurrence and $2,000,000 aggregate for bodily injury liability and $1,000,000 per occurrence and $2,000,000 aggregate for property damage liability. Motor vehicle coverage shall include coverage for owned, hired and non-owned vehicles and shall be in the amount of at least $1,000,000 per person and $2,000,000 per occurrence for bodily injury liability and $1,000,000 per occurrence for property damage liability. The contractor shall carry Workers Compensation in amounts as required by law.

2) All insurance coverage shall be in force from the time of the agreement to the date when all work under the contract is completed and accepted by the District. Since this insurance is normally written on a year-to-year basis, the contractor shall notify the District should coverage become unavailable or if its policy should change.

3) The contractor shall, before commencing performance of the contract, provide by insurance for the payment of compensation and the furnishing of other benefits in accordance with the M.G.L. c 152, as amended, to all employed under the contract and shall continue such insurance in full force and effect during the term of the contract.

4) Certificates and any and all renewals substantiating that required insurance coverage is in effect shall be filed with the contract. Any cancellation of insurance, whether by the insurers or by the insured, shall not be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the District, at least 15 days prior to the intended effective date thereof, which date should be expressed in said notice.

5) The contractor shall indemnify, defend, and save harmless the District, and all of its officers, agents, and employees against all suits, claims of liability of every name and nature, for or on account of any injuries to persons or damage to property arising out of the negligence of the contractor in the performance of the work covered by this contract and/or failure to comply with the terms and conditions of the contract, whether by himself or his employees or sub-contractors.

1.14. OSHA TRAINING

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

1.15. STATEMENT OF COMPLIANCE

The Statement of Compliance shall be signed stating that persons employed by the award recipient are paid in accordance with the provisions of M.G.L. c.149, §§ 26 to 27H. The selected bidder will not be permitted to either assign or underlet the contract, nor assign either legally or equitably any monies there under, or its claim thereto without the previous written consent of the Executive Director.

1.16. MINIMUM WAGE RATES

The listing of CLASSIFICATIONS AND MINIMUM WAGE RATES as determined by the Commissioner of Labor and Industries under the provisions of M.G.L. c.149, §§ 26 to 27H inclusive, as amended, are attached herewith and will be made a part of the contract. The contractor and all subcontractors shall comply with the requirements of M.G.L., c.149, §§ 26 through 27H inclusive, as amended. It is the obligation of the contractor to assure that the contractor and all of its subcontractors comply with the requirements of these requirements. The contractor shall be responsible for all loss, cost, and damage suffered or incurred by the District as a result of any stop work order or other enforcement action taken by the Attorney General under the authority of M.G.L., c.149, §27, and shall release, indemnify, hold harmless and defend the District, its officers, employees and consultants, from and against all claims, actions, suits, fines, or administrative proceedings arising out of or related to the violation by the contractor or any subcontractor of the said Prevailing Wage Law (or, in the case of the contractor's defense obligation, the claimed violation thereof). In accordance with State mandates, the District requires certified payrolls BEFORE payments are made for work performed. If the contract is renewed at the District's option, then the listing of CLASSIFICATIONS AND MINIMUM WAGE RATES will be updated each year.

1.17. DURATION OF BIDS

All bids are to remain valid for sixty (60) days after the opening of bids.

1.18. CONTRACTOR SELECTION

The Sudbury Water District will review all bids, and will award the contract to the lowest responsible and eligible bidder for the total bid value. The District reserves to itself the right to accept or reject any and all bids, or to allow or deny variations from these specifications. In the event that two or more responsible and eligible bidders are tied with the lowest price, then the bidder whose bid was received first by the District will be awarded the contract.

Upon bidder selection, the Sudbury Water District will mail to the selected Contractor, three (3) contracts to be executed by the Contractor and returned to the District with the appropriate insurance certificates and performance and payment bonds. The District will then counter execute the three (3) contracts and return one complete contract to the Contractor. Bidders are expected to review the sample contract. Unless otherwise noted by the District, the terms and conditions contained therein are **NOT** negotiable.

1.19. GENERAL SAFTEY, LICENSES & PERFORMANCE

The contractor's personnel working on this project must hold all necessary licenses and permits to perform the work required under this contract as required under the Commonwealth of Massachusetts regulations. All work must be done in accordance with applicable industry standards, codes and regulations, and/or manufacturer's specifications. The contractor is responsible for providing adequate safety measures during work to ensure protection of life and property. Prior to the commencement of work, all construction signage, safety barriers, and other traffic control devices shall be in place.

All bidders must furnish proof of a minimum of five (5) continuous years in business and provide references.

The contractor shall be informed that there is a thirty (30) day cancellation clause in this contract for improper service. Complaints not rectified within a reasonable length of time from day of notice shall cause the District to notify the contractor by registered mail that his contract will be cancelled thirty days from the date of the letter. Any defective workmanship shown to be caused by improper or faulty installation shall cause the contractor to correct, repair and/or replace all material and labor at no cost to the District. The contractor will warrant that all workmanship shall be first class and shall be performed by persons qualified and licensed in their respective trades.

Any additional work that is performed beyond this agreement must be approved by the Executive Director. The absence of approval from the Director will be considered a violation of the contract.

1.20. INVOICES & REPORTING

Invoices and reports must be sent to the Sudbury Water District, PO Box 111, Sudbury, MA 01776. Additional work performed shall be performed only under the direction of the Executive Director or his designee. Invoices shall be itemized by units and by location or project. Each bill shall contain a cover sheet listing the broken out labor and materials cost, and back-up documents including materials costs, and other relevant information. Certified payroll will be required. Invoices shall not be processed for payment until the above information is provided in a format acceptable to the Director of or his designee.

1.21. SITE MAINTENANCE AND INSPECTION

The selected contractor will be responsible for maintaining the work site in a safe and orderly fashion on a daily basis. The contractor is responsible for the proper securing of all items associated with the project, including but not limited to: debris, tools, material, scaffolding, ladders, etc. Staging and storage areas shall be determined and approved by the Executive Director, or his designee. The contractor is responsible for the removal and disposal of all debris and materials generated from this project.

1.22. NORMAL HOURS OF WORK

Normal hours of work shall be between the hours of 7:30 am and 4:00 pm, Monday through Friday, unless otherwise specified. No work shall be performed on Saturdays, Sundays, Holidays or other than normal hours of work without the express written permission of the Executive Director or his designee. All work in this contract will be identified by the Executive Director or his designee and shall be constructed in accordance with District Specifications or as directed by the Director or his designee.

1.23. MATERIAL DISPOSAL

The contractor, at no additional cost to the District, shall dispose of all surplus material that have been removed from the project site in accordance with all local, state, and federal regulations.

1.24. DIG SAFE LAW

Before proceeding with contraction operations, the contractor shall notify that the State of Massachusetts Underground Plant Damage Prevention System (Dig Safe) at 1-888-344-7233, and shall make such supplemental investigations.

1.25. AWARD OF CONTRACT AND PRE-CONSTRUCTION CONFERENCE

After award of the contract and after a "Notice to Proceed" has been issued by the Executive Director, or his designee, the contractor is obligated to provide to the Executive Director, or his designee, a project schedule for the timing of each part of the construction process, identifying any subcontractors and the work items each subcontractor will be conducting. The "Notice to Proceed" may be sent either by FAX, letter, or email. The contractor shall respond back to the Executive Director within two (2) business days by an employee in authority who can speak on behalf of the company. A pre-construction conference will be held prior to work commencing to review the project schedule, facilitate a meeting between multiple contractors, and meet the "Project Supervisor". Failure to meet these obligations may subject the contractor to loss of the contract and the contractor may be assessed the difference in cost between its bid price and the next lowest responsible and eligible bidder.

1.26. SUPERVISION

The contractor shall designate a "Project Supervisor", in writing, upon receipt of a written Notice to Proceed. Any change in supervision shall require the prior approval in writing of the Executive Director or his designee. Failure of the contractor complying with this requirement may result in the District, after one written warning and at its' sole option, charge a penalty of $200.00 per day until an

approved Project Supervisor is onsite. The Project Supervisor shall be present at each project during the execution of work. Once work has begun the contractor shall pursue and coordinate all work in a continuous and diligent manner until all work is completed unless otherwise directed by the Executive Director or his designated agent.

1.27. PAYMENT

The work under this Bid Item shall be paid for at the contract price based on the measurements as shown on the contract plans and as determined by the Executive Director or his designee. The contract price shall include all materials, labor, equipment and incidentals required to design, furnish, and install the water system complete and in place in accordance with these specifications and as shown on the contract plans and as directed by the Executive Director or his designee and shall include detailed record drawings and tie cards for all gate valves and water services.

1.28. LIQUIDATED DAMAGES

If this Bid is accepted by the Executive Director, the undersigned agrees to complete the entire work provided to be done under the Contract within **90 (ninety) calendar days**, as stipulated in the Agreement. Liquidated damages for each calendar day of delay shall be $1,500 as stipulated in the Agreement.

In submitting this BID, the BIDDER acknowledges that:

Upon receipt of written notice of acceptance of this BID by the OWNER, the BIDDER shall execute the CONTRACT attached to these documents.

END OF STANDARD INSTRUCTIONS TO BIDDERS

SECTION 2
PROJECT SUMMARY

2.1 GENERAL

1. The Work under this contract includes, but is not necessarily limited to, the installation of approximately 1,700 linear feet of new 12-inch ductile-iron water main on Codjer Lane between Union Avenue and Concord Road and the installation of approximately 5,000 linear feet of new 12-inch ductile-iron water main on Horse Pond Road between Trevor Way and Peakham Road. The water main improvements also include the installation of new hydrants, valves, water service connections, and trench pavement.

2. Construction must be complete within **90 (ninety) calendar days** from and including issuance of a notice to proceed, and/or receipt of fully executed contract. Work will commence after July 1, 2019 dependent on funding.

2.2 SCOPE OF WORK

The Work shall consist of furnishing all labor, equipment, materials, tools, apparatus and all other incidental work required to complete the replacement of the existing water mains and transferring existing services from the abandoned mains as specified and shown on the Drawings.

SECTION 3
FORMS

The work of the General Bidder, being all work covered by items 1 through 12, inclusive.

BASE BID – Horse Pond Road					
Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
1a	12-inch DI, CL 52 pipe _____ Dollars and Cents	lf.	5000		
1b	10-inch DI, CL 52 pipe _____ Dollars and Cents	lf.	40		
1c	8-inch DI, CL 52 pipe _____ Dollars and Cents	lf.	50		
1d	6-inch DI, CL 52 pipe _____ Dollars and Cents	lf.	260		
2a	1-inch Water Service Taps and Curb Boxes _____ Dollars and Cents	ea.	30		
2b	1-inch Water Services, Copper Tubing _____ Dollars and Cents	lf.	610		
3a	12-inch Gate Valves and Boxes _____ Dollars and Cents	ea.	14		
3b	10-inch Gate Valves and Boxes _____ Dollars and Cents	ea.	1		
3c	8-inch Gate Valves and Boxes _____ Dollars and Cents	ea.	1		
3d	6-inch Gate Valves and Boxes _____ Dollars and Cents	ea.	16		

BASE BID – Horse Pond Road					
Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
4	Fire Hydrants _____ Dollars and Cents	ea.	13		
5a	Exploratory Excavation _____ Dollars and Cents	cy.	40		
5b	Additional Excavation _____ Dollars and Cents	cy.	40		
5c	Rock Excavation _____ Dollars and Cents	cy.	65		
5d	Gravel Borrow _____ Dollars and Cents	cy.	75		
5e	Processed Gravel _____ Dollars and Cents	cy.	800		
5f	Crushed Stone _____ Dollars and Cents	cy.	30		
6a	Temporary Trench Pavement _____ Dollars and Cents	sy.	2400		
6b	Permanent Pavement Mill and Overlay _____ Dollars and Cents	sy.	4500		
6c	Pavement repairs, sidewalks, parking lots, drive ways, etc. _____ Dollars and Cents	sy.	50		

BASE BID – Horse Pond Road					
Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
7	Additional Fittings _____ Dollars and Cents	lbs.	2350		
8	Additional Mechanical Joint Restraints _____ Dollars and Cents	ea.	8		
9a	Filter Sock _____ Dollars and Cents	lf.	1800		
9b	Silt Sacks _____ Dollars and Cents	ea.	17		
10	Miscellaneous Items _____ Dollars and Cents	ls.	1		
11	Police Allowance _____ Dollars and Cents	all.	1	**$33,000**	**$33,000**
12	Mobilization and Demobilization _____ Dollars and Cents	ls.	1		
				Total	**$**

TOTAL FOR BASE BID

Total Amount of Bid **(Basis of Award)** (Items 1 through 12 inclusive).

$ _____

(Amount in figures)

_____

(Amount in words)

The work of the General Bidder, being all work covered by items A-1 through A-13, inclusive.

ALTERNATE A – Codjer Lane					
Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
A-1a	12-inch DI, CL 52 pipe _____ Dollars and Cents	lf.	1700		
A-1d	6-inch DI, CL 52 pipe _____ Dollars and Cents	lf.	60		
A-2a	1-inch Water Service Taps and Curb Boxes _____ Dollars and Cents	ea.	9		
A-2b	1-inch Water Services, Copper Tubing _____ Dollars and Cents	lf.	140		
A-3a	12-inch Gate Valves and Boxes _____ Dollars and Cents	ea.	5		
A-3d	6-inch Gate Valves and Boxes _____ Dollars and Cents	ea.	3		
A-4	Fire Hydrants _____ Dollars and Cents	ea.	3		
A-5a	Exploratory Excavation _____ Dollars and Cents	cy.	10		
A-5b	Additional Excavation _____ Dollars and Cents	cy.	10		

ALTERNATE A – Codjer Lane					
Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
A-5c	Rock Excavation _____ Dollars and Cents	cy.	20		
A-5d	Gravel Borrow _____ Dollars and Cents	cy.	30		
A-5e	Processed Gravel _____ Dollars and Cents	cy.	280		
A-5f	Crushed Stone _____ Dollars and Cents	cy.	10		
A-6a	Temporary Trench Pavement _____ Dollars and Cents	sy.	800		
A-6b	Permanent Pavement Mill and Overlay _____ Dollars and Cents	sy.	1500		
A-6c	Pavement repairs, sidewalks, parking lots, drive ways, etc. _____ Dollars and Cents	sy.	15		
A-7	Additional Fittings _____ Dollars and Cents	lbs.	500		
A-8	Additional Mechanical Joint Restraints _____ Dollars and Cents	ea.	4		
A-9a	Filter Sock _____ Dollars and Cents	lf.	1400		
A-10	Miscellaneous Items _____ Dollars and Cents	ls.	1		

ALTERNATE A – Codjer Lane					
Item No.	Item Description and Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
A-11	Police Allowance _____ Dollars and Cents	all.	1	**$11,000**	**$11,000**
A-12	Mobilization and Demobilization _____ Dollars and Cents	ls.	1		
A-13	Codjer Ln. and Union St. Connection _____ Dollars and Cents	ls.	1		
				Total	$

TOTAL FOR ADD ALTERNATE A

Total Amount of Add Alternate A (Items A-1 through A-13 inclusive).

$ _____
(Amount in figures)

_____
(Amount in words)

TOTAL FOR BASE BID PLUS ADD ALTERNATE A

$ _____
(Amount in figures)

_____
(Amount in words)

Bidder Acknowledges Addenda #: _____

Company Name: _____

Number of Years in Business: _____

Address: _____

Authorized Signature & Title: _____

Print Name and Title: _____

Form B

BIDDER ACKNOWLEDGMENTS

(Bid Form Consists of six (6) Pages)

Bidder Name: _____

Bidder Acknowledges Addenda#_____

The **Bid Price Form** or an exact copy is to be signed by the individual authorized to negotiate for and contractually bind the Bidder. Failure to fully complete the form, provide the requested information, or make any alterations may be considered a **conditional bid**. Conditional bids will be rejected.

All questions must be answered, and the data given must be clear and comprehensive. Please type or print legibly. If necessary, add additional sheets if needed. This information will be utilized by the District for purposes of determining bidder responsiveness and responsibility with regard to the requirements and specifications of the Contract.

The bidder agrees with submission of this bid that the offer is effective for (a) at least sixty (60) calendar days from the opening date of the bids (b) a contract is executed, or (c) this bid is cancelled, whichever of (a), (b), or (c) occurs first.

The prices shall NOT INCREASE during the contract period. In the event that the unit price and the total price differ, the unit price shall prevail.

The undersigned proposes to provide the services in accordance with the requirements provided by the District dated **March 7, 2019** and any additional **addenda** that may be issued by the District and provided to bidders prior to the opening of the bids. The undersigned hereby states that this offer is effective for (a) at least sixty (60) calendar days from the opening date of the bids, (b) a contract is executed, or (c) this bid is cancelled, whichever of (a), (b), or (c) occurs first. The District reserves the right to award a contract based on sufficiency of appropriated funds to complete the work

The undersigned further agrees that, if selected for award of the contract under this bid, s/he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the District, execute a contract in accordance with the terms of this bid. The undersigned hereby certifies that s/he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that s/he will comply fully with all laws and regulations applicable to awards made subject to Massachusetts General Laws, Chapter 30B.

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

(Name of Company)

BY:

(Signature of Bidder)

(Printed Name and Title of Signatory)

Business Address

(City/DISTRICT, State Zip)

(Telephone) (FAX)

(Email)

(Place and Date When the Business was Organized)

If incorporated, identify the State of Incorporation and Date.

STATE OF INCORPORATION (DATE) ( )

* attach certificate of authority, if applicable

If the bidder is a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

(Date this bid was submitted)

THIS FORM MUST BE COMPLETED and FILED WITH THE SEALED BID SUBMISSION

The BIDDER has responded to and completely filled in all required spaces in the BID document.

This BID Respectfully Submitted by:

IF A SOLELY OWNED COMPANY:

Company Name _____

Address _____

DISTRICT _____

By _____

(Authorized Signature)

Title _____ Date_____

IF A CORPORATION OR LIMITED LIABILITY COMPANY:

A company organized under the laws of _____, composed of officers as follows:

_____ President

_____ Secretary

_____ Vice President

_____ Treasurer

IF A PARTNERSHIP:
A partnership doing business under the firm name and style of _____, composed of partners as follows:

_____ Name & Title (if any)

_____ Name & Title (if any)

_____ Name & Title (if any)

_____ Name & Title (if any)

This Bill must bear the written signature of the BIDDER. If the BIDDER is a partnership, the Bid must be signed by a partner. If the BIDDER is a corporation or limited liability, the Bid must be signed by a duly authorized officer.

Form C

CERTIFICATION OF GOOD FAITH

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion of fraud with any other person. As used in this certification the word "person" shall mean any natural person, business, partnership, corporation, union committee, club, or other organization, entity, or group of individuals.

_____

(Signature of individual submitting bid or proposal)

_____

(Name of Business)

Form D

OSHA CERTIFICATION

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

_____ certifies that:
(Name of Authorized Representative of Contractor)

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

_____
(Signature of Authorized Representative of Contractor)

_____
(Company Name)

Form E

TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. Chapter 62C, §49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____

(Signature of individual submitting bid or proposal)

_____

(Name of Business)

Form F

CERTIFICATE OF AUTHORITY

1. I hereby certify that I am the Clerk/Secretary of _____
(Insert full name of Corporation)

2. corporation, and that _____
(Insert the name of officer who signed the **contract and bonds**)

3. is the duly elected _____
(Insert the title of the officer in line 2)

4. of said corporation, and that on _____
(The date must be **ON OR BEFORE** the date the officer signed the **contract and bonds.**)

at a duly authorized meeting of the Board of Directors of said corporation, at which all the directors were present or waived notice, it was voted that

5. _____ the _____
(Insert **name** from line 2) (Insert **title** from line 3)

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

6. ATTEST: _____ AFFIX CORPORATE
(Signature of **Clerk or Secretary**)* SEAL HERE

7. Name: _____
(Please print or type name in line 6)*

8. Date: _____
(Insert a date that is **ON OR AFTER** the date the officer signed the **contract and bonds.)**

* The name and signature inserted in lines 6 & 7 must be that of the Clerk or Secretary of the corporation.

Form G

Professional Reference Form

Customer: _____

Mailing address_____

_____

Period of Service (MM/YYYY): _____ through _____

Is this a Municipal or other Governmental Unit? ☐ Yes ☐ No

Primary Contact: _____ Title: _____

Telephone: _____ Ext: _____

Email: _____

Customer: _____

Mailing address_____

_____

Period of Service (MM/YYYY): _____ through _____

Is this a Municipal or other Governmental Unit? ☐ Yes ☐ No

Primary Contact: _____ Title: _____

Telephone: _____ Ext: _____

Email: _____

(Make as many copies as necessary, a minimum of 5 references required)

THIS FORM OR SUBSTITUTE WITH THE REQUESTED INFORMATION MUST BE FILED WITH BID SUBMISSION

CODJER LANE & HORSE POND ROAD WATER MAIN IMPROVEMENTS
CONTRACT AGREEMENT

THIS AGREEMENT made this ____ day of XXX __, 2019 by and between the Sudbury Water District, a municipal corporation duly organized under the laws of Massachusetts and having a usual place of business at, 345 Boston Post Road, Sudbury, MA, 01776 hereinafter referred to as the "DISTRICT", and _____, Inc., a corporation having a usual place of business at _____, _____ Massachusetts, _____, hereinafter referred to as the "CONTRACTOR".

WITNESSETH:

Whereas, the DISTRICT invited the submission of bids for the **Codjer Lane & Horse Pond Road Water Main Improvements Project**, "the Project"; and

WHEREAS, the CONTRACTOR submitted a Bid to provide the material or perform the work required to complete the Project, and the DISTRICT has decided to award the contract therefor to the CONTRACTOR.

NOW, THEREFORE, the DISTRICT and the CONTRACTOR agree as follows:

1. Contract Documents. The Contract Documents consist of this Agreement and the CONTRACTOR's Bid Response. The Contract Documents constitute the entire Agreement between the parties concerning the work, and all are as fully a part of this Agreement as if attached hereto.

2. The Work. The Work consists of the **Codjer Lane & Horse Pond Road Water Main Improvements Project** as described on the drawings and in the general specifications.

3. Term of Contract. This Agreement shall be in effect from **xxxxxx** and shall expire upon **xxxxxxxxx** unless terminated earlier pursuant to the terms hereof.

4. Compensation. The DISTRICT shall pay, as full compensation for items and/or services furnished and delivered in carrying out this Agreement in accordance with the Bid Price.

5. Payment of Compensation. The DISTRICT shall make payments within thirty (30) days after its receipt of an Invoice.

6. Liability of the DISTRICT. The DISTRICT's liability hereunder shall be to make all payments when they shall become due, and the DISTRICT shall be under no further obligation or liability. Nothing in this Agreement shall be construed to render the DISTRICT or any elected or appointed official or employee of the DISTRICT, or their successors in office, personally liable for any obligation under this Agreement.

7. Independent CONTRACTOR. The CONTRACTOR acknowledges and agrees that it is acting as an independent CONTRACTOR for all work and services rendered pursuant to this Agreement, and shall not be considered an employee or agent of the DISTRICT for any purpose.

8. Indemnification. The CONTRACTOR shall indemnify, defend, and hold the DISTRICT harmless from and against any and all claims, demands, liabilities, actions, causes of actions, costs and expenses, including attorney's fees, arising out of the CONTRACTOR's breach of this Agreement or the negligence or misconduct of the CONTRACTOR, or the CONTRACTOR's agents or employees.

9. Assignment. The CONTRACTOR shall not assign, sublet or otherwise transfer this Agreement, in whole or in part, without the prior written consent of the DISTRICT, and shall not assign any of the moneys payable under this Agreement, except by and with the written consent of the DISTRICT.

10. Termination.

A. Termination for Cause. If at any time during the term of this Agreement the DISTRICT determines that the CONTRACTOR has breached the terms of this Agreement by negligently or incompetently performing the work, or any part thereof, or by failing to perform the work in a timely fashion, or by failing to perform the work to the satisfaction of the DISTRICT, or by not complying with the direction of the DISTRICT or its agents, or by otherwise failing to perform this Agreement in accordance with all of its terms and provisions, the DISTRICT shall notify the CONTRACTOR in writing stating therein the nature of the alleged breach and directing the CONTRACTOR to cure such breach within ten (10) days. The CONTRACTOR specifically agrees that it shall indemnify and hold the DISTRICT harmless from any loss, damage, cost, charge, expense or claim arising out of our resulting from such breach regardless of its knowledge or authorization of the actions resulting in the breach. If the CONTRACTOR fails to cure said breach within ten (10) days, the DISTRICT may, at its election at any time after the expiration of said ten (10) days, terminate this Agreement by giving written notice thereof to the CONTRACTOR specifying the effective date of the termination. Upon receipt of said notice, the CONTRACTOR shall cease to incur additional expenses in connection with this Agreement. Upon the date specified in said notice, this Agreement shall terminate. Such termination shall not prejudice or waive any rights or action which the DISTRICT may have against the CONTRACTOR up to the date of such termination. Upon such termination, the CONTRACTOR shall be entitled to compensation for all satisfactory work completed prior to the termination date, as determined by the DISTRICT.

B. Termination for Convenience. The DISTRICT may terminate this Agreement at any time for convenience by providing the CONTRACTOR written notice specifying therein the termination date which shall not be sooner than ten days from the issuance of said notice. Upon receipt of said notice, the CONTRACTOR shall cease to incur additional expenses in connection with this Agreement. Upon such termination, the CONTRACTOR shall be entitled to compensation for all satisfactory work completed prior to the termination date, as determined by the DISTRICT, such payment not to exceed the fair value of the services provided hereunder.

11. Inspection and Reports. The DISTRICT shall have the right at any time to inspect the work of the CONTRACTOR, including the right to enter upon any property owned or occupied by the CONTRACTOR, whether situated within or beyond the limits of the DISTRICT. Whenever requested, the CONTRACTOR shall immediately furnish to the DISTRICT full and complete written reports of his operation under this Contract in such detail and with such information as the DISTRICT may request.

12. Successor and Assigns. This Agreement is binding upon the parties hereto, their successors, assigns and legal representatives. Neither the DISTRICT nor the CONTRACTOR shall assign or transfer any interest in the Agreement without the written consent of the other.

13. Compliance with Laws. The CONTRACTOR shall comply with all Federal, State and local laws, rules, regulations and orders applicable to the work provided pursuant to this Agreement, such provisions being incorporated herein by reference, and shall be responsible for obtaining all necessary licenses, permits, and approvals required for the performance of such work.

14. Notice. Any and all notices, or other communications required or permitted under this Agreement, shall be in writing and delivered by hand or mailed postage prepaid, return receipt requested, by registered or certified mail or by other reputable delivery service, to the parties at the addresses set forth on Page 1 or furnished from time to time in writing hereafter by one party to the other party. Any such notice or correspondence shall be deemed given when so delivered by hand, if so mailed, when deposited with the U.S. Postal Service or, if sent by private overnight or other delivery service, when deposited with such delivery service.

15. Change Orders, Price Modifications, and Other Amendments. The DISTRICT shall have the right to require the Contractor to make alterations of, additions to and deductions from the Work. All such changes to the Scope of Work shall be made by a written change order written by the DISTRICT. The Contractor shall compute the effect of the change order upon the Agreement price, subject to review and acceptance by the DISTRICT. Any other changes or amendments to the terms of this Agreement and the other Contract Documents may be made only by a written document referencing this Agreement and executed by both parties.

16. Severability. If any term or condition of this Agreement or any application thereof shall to any extent be held invalid, illegal or unenforceable by the court of competent jurisdiction, the validity, legality, and enforceability of the remaining terms and conditions of this Agreement shall not be deemed affected thereby unless one or both parties would be substantially or materially prejudiced.

17. Governing Law. This Agreement shall be governed by, construed and enforced in accordance with the laws of the Commonwealth of Massachusetts and the CONTRACTOR submits to the jurisdiction of any of its appropriate courts for the adjudication of disputes arising out of this Agreement.

18. Liquidated Damages. DISTRICT and CONTRACTOR recognize that time is of the essence of this Agreement and that DISTRICT will suffer financial loss if the Work is not completed within ninety (90) days, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving the actual loss suffered by DISTRICT if the Work is not completed on time. Accordingly, instead of requiring any such proof, DISTRICT and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay DISTRICT one thousand five hundred dollars ($1,500) for each day that expires after ninety (90) days for Substantial Completion until the Work is substantially complete.

19. Entire Agreement. This Agreement, including all documents incorporated herein by reference, constitutes the entire integrated agreement between the parties with respect to the matters described.

This Agreement supersedes all prior agreements, negotiations and representations, either written or oral, and it shall not be modified or amended except by a written document executed by the parties hereto.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year first above written.

I certify that an appropriation is available in the amount of this contract.

_____
District Accountant

SUDBURY WATER DISTRICT:

_____
Date

By its: Executive Director

_____
(Signature)
Date

CONTRACTOR:

_____
Commissioner
Date

_____
(Signature)
Date

_____
Commissioner
Date

_____
(Print Name and Title)

_____
Commissioner
Date

SECTION 00500

CODJER LANE & HORSE POND ROAD WATER MAIN IMPROVEMENTS
CONTRACT AGREEMENT

THIS AGREEMENT made this ____ day of XXX __, 2019 by and between the Sudbury Water District, a municipal corporation duly organized under the laws of Massachusetts and having a usual place of business at, 345 Boston Post Road, Sudbury, MA, 01776 hereinafter referred to as the "DISTRICT", and _____, Inc., a corporation having a usual place of business at _____, _____ Massachusetts, _____, hereinafter referred to as the "CONTRACTOR".

WITNESSETH:

Whereas, the DISTRICT invited the submission of bids for the **Codjer Lane & Horse Pond Road Water Main Improvements Project**, "the Project"; and

WHEREAS, the CONTRACTOR submitted a Bid to provide the material or perform the work required to complete the Project, and the DISTRICT has decided to award the contract therefor to the CONTRACTOR.

NOW, THEREFORE, the DISTRICT and the CONTRACTOR agree as follows:

1. Contract Documents. The Contract Documents consist of this Agreement and the CONTRACTOR's Bid Response. The Contract Documents constitute the entire Agreement between the parties concerning the work, and all are as fully a part of this Agreement as if attached hereto.

2. The Work. The Work consists of the **Codjer Lane & Horse Pond Road Water Main Improvements Project** as described on the drawings and in the general specifications.

3. Term of Contract. This Agreement shall be in effect from **xxxxxx** and shall expire upon **xxxxxxxxx** unless terminated earlier pursuant to the terms hereof.

4. Compensation. The DISTRICT shall pay, as full compensation for items and/or services furnished and delivered in carrying out this Agreement in accordance with the Bid Price.

5. Payment of Compensation. The DISTRICT shall make payments within thirty (30) days after its receipt of an Invoice.

6. Liability of the DISTRICT. The DISTRICT's liability hereunder shall be to make all

payments when they shall become due, and the DISTRICT shall be under no further obligation or liability. Nothing in this Agreement shall be construed to render the DISTRICT or any elected or appointed official or employee of the DISTRICT, or their successors in office, personally liable for any obligation under this Agreement.

7. Independent CONTRACTOR. The CONTRACTOR acknowledges and agrees that it is acting as an independent CONTRACTOR for all work and services rendered pursuant to this Agreement, and shall not be considered an employee or agent of the DISTRICT for any purpose.

8. Indemnification. The CONTRACTOR shall indemnify, defend, and hold the DISTRICT harmless from and against any and all claims, demands, liabilities, actions, causes of actions, costs and expenses, including attorney's fees, arising out of the CONTRACTOR's breach of this Agreement or the negligence or misconduct of the CONTRACTOR, or the CONTRACTOR's agents or employees.

9. Assignment. The CONTRACTOR shall not assign, sublet or otherwise transfer this Agreement, in whole or in part, without the prior written consent of the DISTRICT, and shall not assign any of the moneys payable under this Agreement, except by and with the written consent of the DISTRICT.

10. Termination.

A. Termination for Cause. If at any time during the term of this Agreement the DISTRICT determines that the CONTRACTOR has breached the terms of this Agreement by negligently or incompetently performing the work, or any part thereof, or by failing to perform the work in a timely fashion, or by failing to perform the work to the satisfaction of the DISTRICT, or by not complying with the direction of the DISTRICT or its agents, or by otherwise failing to perform this Agreement in accordance with all of its terms and provisions, the DISTRICT shall notify the CONTRACTOR in writing stating therein the nature of the alleged breach and directing the CONTRACTOR to cure such breach within ten (10) days. The CONTRACTOR specifically agrees that it shall indemnify and hold the DISTRICT harmless from any loss, damage, cost, charge, expense or claim arising out of our resulting from such breach regardless of its knowledge or authorization of the actions resulting in the breach. If the CONTRACTOR fails to cure said breach within ten (10) days, the DISTRICT may, at its election at any time after the expiration of said ten (10) days, terminate this Agreement by giving written notice thereof to the CONTRACTOR specifying the effective date of the termination. Upon receipt of said notice, the CONTRACTOR shall cease to incur additional expenses in connection with this Agreement. Upon the date specified in said notice, this Agreement shall terminate. Such termination shall not prejudice or waive any rights or action which

the DISTRICT may have against the CONTRACTOR up to the date of such termination. Upon such termination, the CONTRACTOR shall be entitled to compensation for all satisfactory work completed prior to the termination date, as determined by the DISTRICT.

B. Termination for Convenience. The DISTRICT may terminate this Agreement at any time for convenience by providing the CONTRACTOR written notice specifying therein the termination date which shall not be sooner than ten days from the issuance of said notice. Upon receipt of said notice, the CONTRACTOR shall cease to incur additional expenses in connection with this Agreement. Upon such termination, the CONTRACTOR shall be entitled to compensation for all satisfactory work completed prior to the termination date, as determined by the DISTRICT, such payment not to exceed the fair value of the services provided hereunder.

11. Inspection and Reports. The DISTRICT shall have the right at any time to inspect the work of the CONTRACTOR, including the right to enter upon any property owned or occupied by the CONTRACTOR, whether situated within or beyond the limits of the DISTRICT. Whenever requested, the CONTRACTOR shall immediately furnish to the DISTRICT full and complete written reports of his operation under this Contract in such detail and with such information as the DISTRICT may request.

12. Successor and Assigns. This Agreement is binding upon the parties hereto, their successors, assigns and legal representatives. Neither the DISTRICT nor the CONTRACTOR shall assign or transfer any interest in the Agreement without the written consent of the other.

13. Compliance with Laws. The CONTRACTOR shall comply with all Federal, State and local laws, rules, regulations and orders applicable to the work provided pursuant to this Agreement, such provisions being incorporated herein by reference, and shall be responsible for obtaining all necessary licenses, permits, and approvals required for the performance of such work.

14. Notice. Any and all notices, or other communications required or permitted under this Agreement, shall be in writing and delivered by hand or mailed postage prepaid, return receipt requested, by registered or certified mail or by other reputable delivery service, to the parties at the addresses set forth on Page 1 or furnished from time to time in writing hereafter by one party to the other party. Any such notice or correspondence shall be deemed given when so delivered by hand, if so mailed, when deposited with the U.S. Postal Service or, if sent by private overnight or other delivery service, when deposited with such delivery service.

15. Change Orders, Price Modifications, and Other Amendments. The DISTRICT shall have the right to require the Contractor to make alterations of, additions to and deductions from the Work. All such changes to the Scope of Work shall be made by a written change order written by the DISTRICT. The Contractor shall compute the effect

of the change order upon the Agreement price, subject to review and acceptance by the DISTRICT. Any other changes or amendments to the terms of this Agreement and the other Contract Documents may be made only by a written document referencing this Agreement and executed by both parties.

16. Severability. If any term or condition of this Agreement or any application thereof shall to any extent be held invalid, illegal or unenforceable by the court of competent jurisdiction, the validity, legality, and enforceability of the remaining terms and conditions of this Agreement shall not be deemed affected thereby unless one or both parties would be substantially or materially prejudiced.

17. Governing Law. This Agreement shall be governed by, construed and enforced in accordance with the laws of the Commonwealth of Massachusetts and the CONTRACTOR submits to the jurisdiction of any of its appropriate courts for the adjudication of disputes arising out of this Agreement.

18. Liquidated Damages. DISTRICT and CONTRACTOR recognize that time is of the essence of this Agreement and that DISTRICT will suffer financial loss if the Work is not completed within ninety (90) days, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving the actual loss suffered by DISTRICT if the Work is not completed on time. Accordingly, instead of requiring any such proof, DISTRICT and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay DISTRICT one thousand five hundred dollars ($1,500) for each day that expires after ninety (90) days for Substantial Completion until the Work is substantially complete.

19. Entire Agreement. This Agreement, including all documents incorporated herein by reference, constitutes the entire integrated agreement between the parties with respect to the matters described. This Agreement supersedes all prior agreements, negotiations and representations, either written or oral, and it shall not be modified or amended except by a written document executed by the parties hereto.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year first above written. I certify that an appropriation is available in the amount of this contract.

_____
District Accountant

SUDBURY WATER DISTRICT:

By its: Executive Director

_____
(Signature) Date

_____
Commissioner Date

_____
Commissioner Date

_____
Commissioner Date

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NOTICE OF AWARD

TO: DATE:

PROJECT DESCRIPTION: **Codjer Lane and Horse Pond Road Water Main Improvements**

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

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

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

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

It is acknowledged that ____ of your bid prices are abnormally low. It is understood that this will be waived as an informality as to form in your Bid. However you are hereby notified that the unrealistically low unit prices not reflecting the actual cost of the work bars you from any equitable adjustment of unit price bid items described in paragraph 5.1 of Section 00500 of the Contract Documents. The specific bid items of note are:_____.

You are required to return an acknowledged copy of this Notice of Award to the Owner. Dated this _____ day of _____, 2019.

By Its Executive Director

_____

_____

_____ Date:_____

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged, this, the _____ day of _____, 2019.

By: _____

Title: _____

NOTICE TO PROCEED

TO: DATE:

PROJECT DESCRIPTION: **Codjer Lane and Horse Pond Road Water Main Improvements**

You are hereby notified to commence the Work in accordance with the Agreement dated _____, on or before _____, and you are to complete all work within **ninety (90) consecutive calendar days** thereafter. The date of completion of all work is, therefore, _____.

Town of Sudbury Board of Selectman

_____

_____

_____ Date:_____

END OF SECTION 00550

DOCUMENT 00610

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS,

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

WHEREAS, the said principal has, by means of a written agreement, dated _____, entered into a contract with the said obligee for the **Codjer Lane and Horse Pond Road Water Main Improvements,** a copy of which agreement is attached hereto and by reference made a part hereof.

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

In the event that the work under said contract is abandoned by the principal or is

terminated by the Sudbury Water District under the provisions of Sections of said Contract, said surety hereby further agrees that said surety shall, if requested in writing by the Sudbury Water District, take such action as is necessary to complete the work under said contract.

And the said surety, for value received, hereby stipulates and agrees that no change in, or extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder, or to the Specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the Specifications.

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

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

PRINCIPAL:	**SURETY:**
_____	_____
By:_____	By:_____
(Title)_____	(Title)_____

END OF SECTION 00610

DOCUMENT 00620

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

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

WHEREAS, the said principal has, by means of a written agreement, dated _____ entered into a contract with the said obligee for the **Codjer Lane and Horse Pond Road Water Main Improvement**, a copy of which agreement is attached hereto and by reference made a part hereof.

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

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

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

PRINCIPAL:	**SURETY:**
_____	_____
By:_____	By:_____
(Title)_____	(Title)_____

END OF SECTION 00620

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

EJCDC®
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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

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

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

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

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

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11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

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

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

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

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

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26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

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

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

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

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

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

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable,"

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

C. *Day*:

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

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

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

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

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

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

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

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

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

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2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

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3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

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

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

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

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

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

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

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

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1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

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

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

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

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

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

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

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2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

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

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

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

5.03 *Subsurface and Physical Conditions*

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and

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

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

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

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

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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

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

D. *Possible Price and Times Adjustments*:

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

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

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b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

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

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

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

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming

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

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

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

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

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5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

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

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

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related

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

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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

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

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and

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

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

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1. Products and completed operations coverage:
    a. Such insurance shall be maintained for three years after final payment.
    b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
3. Broad form property damage coverage.
4. Severability of interest.
5. Underground, explosion, and collapse coverage.
6. Personal injury coverage.
7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be

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

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials

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

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

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

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

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C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

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

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of

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

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

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor

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

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

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B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct

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contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:

1) all variations of the proposed substitute item from that specified, and

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

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

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

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D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

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

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

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O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

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

7.09 *Taxes*

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

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7.10 *Laws and Regulations*

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

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss;

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

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

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

7.15 *Emergencies*

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

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7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

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

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

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

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

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

2. *Samples*:

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

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

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

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

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner

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

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

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

8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

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

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor

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

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

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

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

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

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

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B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

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

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

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

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

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

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10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

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

10.04 *Rejecting Defective Work*

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

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

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

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

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

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

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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

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

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

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

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

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

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2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

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

11.03 *Unauthorized Changes in the Work*

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

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

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2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

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

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

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

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

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

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

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

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E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns

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

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

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

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

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

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

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

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

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

    h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

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i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

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

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

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

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required

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

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

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

14.04 *Acceptance of Defective Work*

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

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

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14.06 *Owner May Stop the Work*

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

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for

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

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

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c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

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

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

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g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons

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

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

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15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all disputes that Contractor believes are unsettled; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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

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

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

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

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

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

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C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

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

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

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E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

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

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

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18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Headings*

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

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SECTION 00800

SUPPLEMENTAL CONDITIONS

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

ARTICLE 1. DEFINITIONS AND TERMINOLOGY

SC-1.01.A.13

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

The Invitation to Bid, Instructions to Bidders

SC-1. 01.A.28

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

The “Owner” shall mean the Sudbury Water District, Massachusetts acting through its Executive Director.

SC-1. 01.A.40

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

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

SC-1. 01.A.49

Add the following definition to the General Conditions:

“State” shall mean the Commonwealth of Massachusetts.

ARTICLE 2. PRELIMINARY MATTERS

SC-2.05

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

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

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

ARTICLE 3. DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01

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

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

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

ARTICLE 4. COMMENCEMENT AND PROGRESS OF THE WORK

SC 4.01

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

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

SC-4.03.A

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

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

SC-4.04

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

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

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

SC-5.01

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

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

SC-5.04

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

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

ARTICLE 6. BONDS AND INSURANCE

SC-6.02

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

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

SC-6.03

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

6.03.A Workers' Compensation.

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

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

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

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

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

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

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

SC-6.04

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

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

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

SC-6.05

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

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

or otherwise provided in these Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment."

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

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

SC-6.07

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

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

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

ARTICLE 7. CONTRACTOR'S RESPONSIBILITIES

SC-7.06

Add the following new paragraph as follows:

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

SC-7.06

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

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

SC-7.09

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

“7.09.A.1 The materials and supplies to be used in the Work under this Contract are exempt from the Sales and Use Tax of the Commonwealth of Massachusetts. Contractor shall obtain the proper certificates, maintain the necessary records, and otherwise comply with all applicable requirements governing the exemption from sales tax.”

SC-7.16

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

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

ARTICLE 8. OTHER WORK AT THE SITE

SC-8.03

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

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

ARTICLE 9. OWNER'S RESPONSIBILITIES

SC-9.06

Delete paragraph 9.06 of the General Conditions in its entirety.

ARTICLE 10. ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.01

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

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

SC-10.03

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

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

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

SC-11.02

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

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

SC-11.02

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

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

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

ARTICLE 12. CLAIMS

SC-12.01

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

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

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

SC-13.01

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

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

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

SC-13.02

Delete paragraph 13.02 of the General Conditions in its entirety.

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

SC-15.01

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 18. MISCELLANEOUS

SC-18.08

18.08 Headings:

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

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

18.09 Legal Address of Contractor

Add the following paragraph immediately after section 18.08:

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

END OF SECTION 00800

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DIVISION 1

GENERAL REQUIREMENTS

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SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE OF WORK

A. The Work under this contract includes, but is not necessarily limited to, the installation of approximately 1,700 linear feet of new 12-inch ductile-iron water main on Codjer Lane between Union Avenue and Concord Road and the installation of approximately 5,000 linear feet of new 12-inch ductile-iron water main on Horse Pond Road between Trevor Way and Peakham Road. The water main improvements also include the installation of new hydrants, valves, water service connections, and trench pavement.

B. The Work shall consist of furnishing all labor, equipment, materials, tools, apparatus and all other incidental work required to complete the replacement of the existing water mains and transferring existing services from the abandoned mains as specified and shown on the Drawings. The Work shall include, but not necessarily be limited to the following:

1. Furnishing, installation, relocation, and removal of all piping, fittings, valves, hydrants, thrust blocks, restrained joints, couplings, appurtenances and service connections as shown on the plans and as directed by the Engineer required for the installation of the new 12-inch water mains.

2. Perform all required testing and disinfection of the new water mains.

3. Adjustments/repairs and/or replacement of utility appurtenances (manholes, catch basins and water valves, frames, grates and covers, gate boxes, etc.) and other related work, as specified or directed by the Engineer.

4. Removal and legal disposal of all trench and pipe materials encountered and removed to facilitate construction.

5. Furnishing all materials and performing all excavations, backfilling of excavated areas, and restoration of surface pavement.

6. Furnishing all labor, materials, and necessary equipment to loam and seed disturbed areas as shown on the drawings including all costs associated with the excavation and disposal of unsuitable material in areas to receive loam

and seed.

7. Installation of bituminous concrete trench pavement as specified or as directed by the Engineer.

8. Restoration of sidewalks, driveways, granite curbs and berms, and landscaped areas as shown or as directed by the Engineer.

9. Furnishing, installation and maintenance of all traffic control and safety measures during the construction period, including signs, barricades, detours, coordination of police details, maintenance of safe vehicular and pedestrian access to abutting properties, businesses and commercial establishments and assuring an uninterrupted supply of utility services to all public amenities, businesses and abutters within the project area, at all times.

10. Maintenance and repair of all work for a period of one (1) year following the issuance of the Certificate of Substantial Completion.

11. The Work shall also conform to such additional Drawings and addenda to these Specifications and Drawings as may be published or exhibited prior to the opening of bid proposals and to such Drawings in explanation of details, or as may be furnished by the Engineer from time to time during the construction.

12. Work, materials, equipment, and storage areas, which are necessary for construction, but which are not specifically referred to in the Specifications or shown on the Drawings, but implied by the contract, shall be furnished by the Contractor at his own cost and expense, and shall be such as will correspond with the general character of the Work, as may be determined by the Engineer, whose decisions as to the necessity for and character of such work and materials shall be final and conclusive. It is the intent of these Specifications to produce a complete, finished job, whether shown in every detail or not.

13. Furnishing all materials, labor, and equipment for the relocation, protection, or temporary disturbance of existing utilities (i.e. water, gas, drain) to permit water main improvement activities.

14. Furnishing, installation, operation and maintenance of construction dewatering system and appurtenances in accordance with various regulatory approvals, as required.

15. Restoration of municipal and private property including turf, landscaping, docks, outbuildings, hardscapes, utilities, fencing, and trees.

16. Repair and/or replacement of any traffic signal loops in accordance with MassDOT requirements.

17. Coordination of all construction activities with the appropriate local and State Authorities, and utility companies.

18. Attending the Pre-construction conference and the required job progress meetings.

19. Submission of a construction schedule, list of subcontractors, and proposed sources locations for off-site materials.

20. Submission of all required shop drawings, in a timely manner, to the Engineer, for review.

21. Mobilization/Demobilization to/from the site.

22. On-site and laboratory testing, as specified.

23. Installation and maintenance of erosion controls; consisting of filter sock, silt sacks and silt bags, and providing dust control as required.

24. Coordination of all construction activities with the Engineer, Owner, Regulatory Agencies, Local Utilities, and Police.

25. Obtaining necessary permits and licenses, maintaining all items required by applicable permits, and payment of fees.

26. Provide a set of clearly labeled red line as-built drawings and construction photographs at the completion of the project.

C. The work shall also conform to such additional Drawings and addenda to these Specifications and Drawings as may be published or exhibited prior to the opening of bid proposals and to such Drawings in explanation of details, or as may be furnished by the Engineer from time to time during the construction.

D. Work and materials which are necessary in the construction, but which are not specifically referred to in the Specifications or shown on the Drawings, but implied by the contract, shall be furnished by the Contractor at his own cost and expense, and shall be such as will correspond with the general character of the work, as may be determined by the Engineer, whose decisions as to the necessity for and character of such work and material 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.

1.3 CONTRACTOR'S USE OF PREMISES

A. Contractor shall limit the use of the premises for his/her Work and for storage to allow for:

1. Property Owner occupancy, including Easements.

2. Public use.

B. Coordinate use of premises with Owner.

C. Contractor shall assume full responsibility for security of all his/her and his/her subcontractors' materials and equipment stored on the site.

D. If directed by the Owner or Engineer, move any stored items which interfere with operations of Owner or other contractors.

E. Obtain and pay for use of additional storage areas or work areas as necessary and required to perform the Work.

1.4 PROPERTY OWNER OCCUPANCY

A. Property Owner will occupy premises during performance of the Work for the conduct of his/her normal operations. Coordinate all construction operations with Owner to minimize conflict and to facilitate Property Owner usage.

B. A general description of the Work to be performed under this contract shall include, but will not be limited to, the following construction operations:

1. Coordination of all construction activities with the appropriate local and State authorities and utilities.

2. Attending the pre-construction conference and required job progress meetings.

3. Submission of a construction schedule, list of subcontractors and submission of all required shop drawings, in a timely manner, to the Engineer for review.

4. Mobilization to the site.

5. Protection of existing structures and installation of environmental control measures.

6. Coordination of environmental protection procedures in accordance with local, state, and federal regulatory approvals.

7. Restoration of disturbed areas, outbuildings, landscaping, hardscapes, and appurtenances on residential properties to pre-construction conditions and elevations within the limits of work.

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

1.5 UTILITIES

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01010

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SECTION 01024

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 SUMMARY

A. Under the price specified to be paid for each item, the Contractor shall furnish all materials and equipment, furnish all labor and plant and perform all operations to complete all work as indicated and specified. Provide all supervision, overhead items, bond and permit costs, protection and precautions and all other costs, incidental to the construction work, complete, and as specified, are also included.

B. A complete, finished, working job, as intended by the general nature of these Specifications, shall be produced whether or not any particular wording or direction is omitted or inadvertently not clearly stated.

C. Measurement for payment shall be by the Engineer, except where noted elsewhere in this Specification. Measurement for payment for lump sum items shall be on the basis of percentage of work complete and in place.

D. Each unit or lump sum price stated in the Bid shall constitute full compensation as herein specified for each item of work completed in accordance with the Drawings and Specifications.

E. The prices for those items which involve excavation shall include compensation for disposal of surplus excavated material, handling of water, and any required shoring or bracing for compliance with OSHA regulations.

F. The prices for all pipe items shall constitute full compensation for furnishing, laying, jointing, cleaning, flushing, chlorinating and testing of pipe; excavation and backfill; and clean up.

G. In all items involving excavation, the price shall be based on doing the entire excavation in earth. Where rock is excavated, the price thereof shall be in addition to the cost of excavating earth, and no deduction will be made in the amount for earth excavation.

H. Unit prices submitted for various items of work will be utilized for determining prices of any additional work necessary during construction.

I. Final payment shall not be issued until the Contractor submits project record drawings approved by the Engineer.

J. In accordance with Chapter 150 of the Acts of 2013 (An Act Relative to Price Adjustments for Certain Materials in Construction Projects), specifically Section 38A, of Massachusetts General Laws Chapter 30, the following materials will be eligible for price adjustments in accordance with Appendix C and applicable Specification Sections: fuel (both diesel and gasoline); liquid asphalt; and, portland cement (contained in cast-in-place concrete). The noted material price adjustments are applicable on a monthly basis only when the monthly cost change in base prices exceeds +/- 5%.

1.2 Item Descriptions

Furnishing all equipment, labor, plant, materials, and components, installing all systems and appurtenances, and performing all work shown on the Drawings and described in the Specifications.

A. The subsequent description of bid items 1- 11 pertains to both base bid items and Add Alternate bid items. Add Alternate bid item numbers are preceded by the letter of the associated Alternate bid. The description of the bid items shall be the same for the base bid and for each Add Alternate bid, even though the paragraph description does not include the bid alternate letter with the item number.

B. Item 1: Ductile Iron Water Main

1. Ductile iron water main pipe, fittings, restrained joints, and caps under Item 1 will be measured for payment by the linear foot of water main furnished, installed, completed, and accepted in place. Measurement will be along the water main centerline without deduction for valves and fittings. Hydrant branch lines will be measured from the center of the main line tee to the centerline of the hydrant.

2. Under Items 1a, 1b, 1c, and 1d, payment for the water pipe as specified will be made at the Contract unit price stated in the Bid Proposal for the quantities as measured in place on a linear foot basis. Payment shall be considered as full compensation for furnishing, installing, maintaining, and removing all labor, equipment, materials, devices, services, and related appurtenances including: traffic control devices, signs, a variable message board, barriers, cones and barrels; all pipe, fittings, restrained joints, caps and plugs, tapped caps and corporations; underground warning tape with metal core; insulation as required; polyethylene “V-BIO” encasement as required and as indicated on the plans; environmental protection measures; connections to existing mains and hydrants where required; couplings not included for payment elsewhere; trench excavation (except rock excavation covered under Item 5c); bracing including trench boxes and trench shields; protection of utilities; cutting or excavation of existing sheeting; trench dewatering; decommissioning gate valves on abandoned lines and removing gate boxes; backfilling and compaction, and steel plating prior to final paving; restoring the trench surface to grade; calcium chloride for dust control as directed by the Engineer; removal and legal disposal of existing water main as indicated; removing and resetting guardrails (if necessary); disposal of excavated materials; landscaping; 6” loam and seed

over disturbed areas; permit compliances and associated fees; surface restoration (except paving covered under Item 6); pressure testing; providing water for pressure and leakage tests; disinfection; flushing; sampling; laboratory analyses; returning physical features to their original condition; clean up; and all else incidental thereto, for which separate payment is not provided under other items in the Bid Proposal.

3. Water pipe installed but not successfully tested and/or chlorinated will be paid for at a maximum of 90 percent of the unit prices bid under Item 1 of the proposal. The remaining 10 percent will be paid upon receipt of successful written test results by the Engineer. All reductions in payment due to unsuccessful testing will be made prior to normal retainage.

4. Included under Item 1 are fittings, including but not limited to: solid sleeves, tees, bends, off-sets, caps, plugs, reducers, and couplings.

C. Item 2: Water Service Connections

1. Service taps, including corporation stops, fittings, couplings, caps, saddles, curb stops and boxes, to be paid for under Item 2a will be measured as the number of different size services each actually installed and connected to the new water main in the completed project as indicated on the Contract Drawings and as accepted by the Engineer. Payment will be considered full compensation for furnishing all labor, equipment, materials, adaptors, services, excavation and backfill, surface restoration, landscaping, and all else incidental thereto for which separate payment is not provided. Each service tap shall be complete and include corporation stops, saddles (services larger than one inch and all services installed on asbestos-cement water mains), fittings, caps (if new service connection), curb stops, curb boxes, and roadway boxes (services larger than one inch). Service tubing will be paid for under Item 2b.

2. Water services to be paid for under Item 2b will be measured for payment by the actual number of linear feet of water services, as specified, measured in place along the centerline of the pipe from the proposed water main to the locations indicated on the standard details. This price and payment will be considered full compensation for all labor, equipment, materials, and services necessary for installing the tubing including excavation, dewatering, cutting or excavating existing sheeting, sheeting and shoring, sand bedding, backfill, compaction, surface restoration, landscaping, connections to existing services, adapters, couplings, tracing wire (if necessary), flushing, and all else incidental for the satisfactory completion of the work. Payment shall also be considered full compensation for removing, legally disposing, and replacing concrete panels disturbed by the water service installation. All excavation, backfill, surface restoration, and landscaping associated with water services shall also be included as part of this pay item.

D. Item 3: Valves and Valve Boxes

1. The number of resilient wedge gate valves with boxes to be paid for under Item 3 will be measured as the number actually installed in the completed project and accepted by the Engineer.

2. Payment for furnishing and installing valves with boxes will be made for each installed under Items 3a, 3b, 3c, and 3d. Payment will also be considered full compensation for furnishing all labor, equipment, materials, and services required or incidental for the satisfactory completion of the work.

E. Item 4: Fire Hydrants

1. Payment for furnishing and installing hydrants will be made for each installed under Item 4. Payment will also be considered full compensation for furnishing all labor, equipment, and materials required for excavation and backfill, installation of tie rods, concrete thrust blocks with a compressive strength of at least 2000 psi, placing drain stone, furnishing and installing hydrant extension kit if required, decommissioning and properly disposing of existing hydrants, pressure testing, disinfection, painting the hydrant, removal of excess excavated material, surface restoration, landscaping, clean up and all else incidental thereto for the satisfactory completion of the work. Payment shall also be considered full compensation for removing, legally disposing, and replacing concrete panels disturbed by the hydrant installation. All 6-inch gate valves and boxes and 6-inch D.I. pipe required for hydrant installation will be included for payment under their respective Items in the Contract Documents.

F. Item 5: Excavation and Additional Fill

1. Under the unit price bid for Item 5a, the Contractor shall excavate and refill, as directed and approved by the Engineer, such materials as are necessary to locate pipe, utilities and possible obstructions. Included under the unit price is payment for excavation, dewatering, backfill, compaction, surface restoration, landscaping, all labor, services and equipment necessary for exploratory excavations in the locations of this Contract. Measurement for payment will be on the basis of cubic yards of exploratory excavation as measured and approved by the Engineer. Paving shall be included for payment as specified under Item 6.

2. Under the unit price bid for Item 5b, the Contractor shall excavate below the specified depth to clear utilities or match existing mains, or to remove peat or other unsuitable material, below the grade of pipe, when and as directed by the Engineer; load, transport, and waste such material away from the job as directed; furnish and place approved fill material in the place of material removed. Measurement for payment will be on the basis of cubic yards of material excavated within the detailed trench payment width and at authorized depth, as measured by the Engineer.

3. Under the unit price bid for Item 5c, the Contractor shall excavate, remove, and dispose of ledge and rock from trenches and excavated areas. Included in the price bid per cubic yard shall be related costs such as hoe-ramming, expansive grout or similar materials, drilling, pre-blast survey, blasting, and replacement with suitable and compacted gravel borrow material, removal, and disposal of excavated material. Rock that is excavated by normal excavation methods will not be measured under this Item. Measurement for payment will be on the basis of cubic yards of ledge or rock excavated as measured by the Engineer.

4. Rock in pipe trenches shall be measured from its surface to 6-inches below the outside of the pipe and with a width of two (2) feet greater than the inside diameter of the pipe but not less than 3 feet minimum trench width. Any rock excavated to a depth or width greater than the above shall be removed and backfilled with common fill at the Contractor's expense.

5. Item 5d, when its use is required and approved and when furnished, placed, and compacted for trench backfill to replace unsuitable materials and miscellaneous uses, will be measured in cubic yards at actual in-place dimensions as determined by the Engineer. When used in trenches, the payment limits shall not exceed the trench widths defined for rock. No allowance will be made for loss from consolidation of material. Truck measurement will not be permitted. No additional payment will be made under this item for reuse of excavated material and any surplus material generated from the construction of this project.

6. Item 5e, when its use is approved and when furnished, placed and compacted for replacement of unsuitable materials and for miscellaneous uses will be measured in cubic yards at actual in-place dimensions as determined by the Engineer. When used in trenches, the widths for payment shall not exceed those defined for rock excavation or as approved by the Engineer. No allowance will be made for loss from consolidation of material. Truck measurement will not be permitted. Excavated material, which is reused as pavement sub-base, will not be measured for payment. This item will be used for pavement subbase in road widening areas.

7. Item 5f, when its use is approved, shall be furnished and placed by the Contractor, as specified or directed by the Engineer. Measurement for payment will be on the basis of cubic yards of material placed and compacted to the designated thickness as shown in the trench detail or as specified.

G. Item 6: Pavement

1. The quantities of pavement for roadways, driveways, sidewalks, and parking lots, Type I-1 bituminous pavement, to be measured for payment under the appropriate subdivisions of Item 6 will be measured based on the number of square yards as measured in place (approximate coefficient of 0.056 tons per square yard per inch of thickness). Measurement of pavement over trenches shall be limited to a maximum pay limit width listed on the Drawings. The

Contractor shall maintain pavement in good repair and flush with the existing pavement at all times during the duration of the Contract. If defects occur in surfacing constructed by the Contractor, remove bituminous concrete and sub-base and replace sub-base material and bituminous concrete as is necessary to properly correct defect. Also included for payment under the appropriate subdivisions of Item 6 are the services, labor, equipment and materials required for replacement of pavement markings (line striping), placement of new pavement marking (line striping), adjusting existing utility valve and service boxes, castings and structures, not included for payment elsewhere, where required.

2. The unit price listed for Item 6a shall constitute full compensation for furnishing and placing 4-inch thick of hot mix asphalt (compacted thickness) for trench pavement including service trenches to the depth and width indicated within payment limits and as specified and as indicated on the Drawings. The unit price includes but is not limited to the following: removing of gravel base where required, furnishing, installing, restoring and regrading the gravel base course; raising and resetting existing structures and boxes; installation and compaction of 4-inch thick hot mix binder course asphalt in two lifts; hand placement and compaction of hot mix asphalt around structures, frames, castings, aprons, and as directed; compaction testing, power sweeping; furnishing and placing tack coat on all edges; furnishing pavement markings as required, maintaining and leveling the pavement for the duration prior to final paving; and all incidental work not included for payment elsewhere. Measurement of pavement for Item 6a will be made based on the square yardage of material installed as determined by the engineer. Measurement of pavement for other miscellaneous work shall be limited to a maximum width of 4 feet.

3. The unit price listed for Item 6b shall constitute full compensation for furnishing and placing 2-inch thick of hot mix asphalt (compacted thickness) for trench pavement including service trenches to the depth and width indicated within payment limits and as specified and as indicated on the Drawings. The unit price includes, but is not limited to, the following: removing of gravel base where required, furnishing, installing, restoring and regrading the gravel base course; raising and resetting existing structures and boxes; milling of 1.5” of previously placed temporary trench pavement’ installation and compaction of 2” thick hot mix modified top course asphalt in a minimum of one lift; hand placement and compaction of hot mix asphalt around structures, frames, castings, aprons, and as directed; compaction testing, power sweeping; furnishing and placing tack coat on all edges; furnishing pavement markings as required, maintaining and leveling the pavement for the duration prior to final paving; and all incidental work not included for payment elsewhere. Measurement of pavement for Item 6b will be made based on the square yardage of material installed as determined by the engineer. Measurement of pavement for other miscellaneous work shall be limited to a maximum width of 4 feet.

4. Payment for hand placement of bituminous paving materials in driveways, driveway aprons, sidewalks, waterways and runoffs shall be made at the unit price bid under Item 6c. Under the unit price bid price for this item, the Contractor shall provide all labor, materials, and equipment necessary to install Type I-1 bituminous asphalt sidewalk and Type I-1 bituminous asphalt for driveways and transition aprons to existing driveways and cross streets as shown on the drawings. Payment shall be considered as full compensation for all labor, equipment, materials, devices, services, and related appurtenances including raising existing structures if required. All costs associated with clearing and grubbing as required, subgrade preparation and installation of a gravel base as specified, rough grading and fine grading, and furnishing and placing of 2" compacted binder thickness shall be included as part of this pay item. The unit price bid shall include all labor, materials and equipment necessary to complete the work as specified, including replacing damaged Cape Cod Berm, resetting vertical granite curbing, or furnishing and installing new vertical granite curbing, as necessary. Payment for this unit price item shall be based on the square yards of pavement installed as determined by the Engineer.

5. The unit prices listed for work under the appropriate subdivisions of Item 6 will include all road painting conforming to Massachusetts Department of Public Works specifications.

6. Item 6 shall be subject to a separate Price Adjustment payment item each month for the liquid asphalt component of the Pavement furnished and installed. The Price Adjustment shall be based on the percent increase or decrease in the cost of Hot Mix Asphalt Mixtures between the base price, which is the price listed by MassDOT for the month in which bids are received, and the period price which is the price listed by MassDOT for the month in which the asphalt was placed. Refer to Specification Section 02576 for more information on the Price Adjustment.

H. Item 7: Additional Fittings

1. The quantity of additional fittings to be measured for payment under Item 7 shall be the total weight of the fittings in pounds actually installed as ordered by the Owner in addition to the fittings indicated on the drawings. Additional fittings shall be approved for payment only upon specific approval of their use by the Owner.

2. The unit price for Item 7 shall constitute full compensation for furnishing, setting, jointing, testing and disinfecting the additional fittings, including restrained joints, concrete thrust blocks with a compressive strength of at least 2000 psi, excavation and backfill and all other work incidental thereto.

I. Item 8: Additional Mechanical Joint Restraints

1. The quantity of additional restrained joints to be measured for payment under Item 8 shall be the actual number of joints restrained as ordered by the

Engineer, which are in addition to those joints used for fittings and indicated on the drawings to be restrained. Restrained joints used for fittings and indicated on the drawings shall be paid for under Item 1. Additional restrained joints shall be approved for payment only upon specific approval of their use by the Owner.

2. The unit price for Item 8 shall constitute full compensation for furnishing, setting, jointing and testing the restrained joints in addition to the compensation provided under Item 8.

3. Use of restrained joints under this item will not relieve the requirement for concrete trust blocks unless specifically permitted by the Engineer.

J. Item 9: Erosion Control Devices

1. Under the unit price for Item 9a, the Contractor shall furnish and place filter sock sedimentation barriers for sedimentation/erosion control and protecting wetlands, catch basins, drains, etc., where shown on the Drawings. Payment will be made at the unit price bid per linear foot of barrier furnished and installed. Payment will be based on the length of barrier placed as measured by the Engineer. Payment will include all costs for labor, materials, and equipment required to furnish, install, maintain, replace, remove and dispose of barriers.

2. Under the unit price for Item 9b, the Contractor shall furnish and place silt sacks or approved equal in each catch basin or drop inlet for sedimentation/erosion control and protecting wetlands, catch basins, drains, etc., where shown on the Drawings. Payment will be made at the unit price bid for each sack furnished and installed. Payment will include all costs for labor, materials, and equipment required to furnish, install, maintain, replace, remove and dispose of sacks. Payment will also include cleaning of each sack weekly throughout the duration of construction by removal and legal disposal of materials accumulated in each sack.

K. Item 10: Miscellaneous Items

1. Under the lump sum price for Item 10, the Contractor shall provide general construction services and furnish other appurtenant items necessary to complete all other work identified within this contract, which is not included in Bid Items 1 through 9 and A-12 (if applicable). This shall include, but is not limited to, the following:

a. Removing, temporary stockpiling, and resetting street signs, sign posts, rural mailboxes, fences, and all other surface features that are required to be temporarily removed during sidewalk construction.

b. Field engineering including site layout and control, the establishment of

vertical and horizontal site control, construction line and grade, and layout.

c. Attending the pre-construction conference and all required job progress and community meetings, and coordination of all construction activities with the appropriate local authorities and utilities.

d. Submission of all schedules, lists, laboratory test results, materials and sources, survey documentation, and shop drawings, as required, in a timely manner to the Engineer for review and approval.

e. Furnishing, setting, jointing, testing, disinfecting, and installing all additional fittings and additional restrained joints as necessary.

f. Environmental protection measures, and calcium chloride for dust control as directed by the Engineer.

g. All labor, materials, and necessary equipment to loam and seed disturbed areas as shown on the drawings including all costs associated with the excavation and disposal of unsuitable material in areas to receive loam and seed.

h. Coordination of all construction activities with the Engineer, Owner, Regulatory Agencies, local utilities, and police. Obtaining necessary permits and licenses, and payment of associated fees, as required.

i. Providing a site-specific Health and Safety Plan for the Contractor's employees, in accordance with the minimum standards set forth in OSHA 29 CFR 1910.120. The Plan and Statement of Certification shall be submitted to the Engineer for their records prior to construction.

j. Provide a set of clearly labelled red line as-built drawings at the completion of the project.

k. Additional erosion control measures to prevent exposed fill, excavated material, or other materials from washing away or otherwise eroding from slopes or into wetlands.

l. Restoration of bituminous concrete curb and granite curbing as required.

m. Temporary facilities and providing required bonds and insurance.

n. Coordination with utility companies and payments for support of utility poles as required to safely perform the work.

o. Maintenance and repair of all work for one (1) year period.

MEASUREMENT AND PAYMENT

p. Providing material testing, laboratory analysis of materials, and quality assurance testing for earthwork activities.

q. Preparation and submission of all shop drawings, schedules, lists, materials and sources, survey documentation, record documents, and environmental monitoring documentation as required by the Contract Documents, in a timely manner to the Engineer for review and approval.

r. Construction Photographs.

s. Field verification of all existing utilities.

t. All other project related direct and indirect costs not described above

u. Contract closeout.

2. Payment for this lump sum Item shall be made based on the percentage of work completed, as determined by the Engineer.

L. Item 11: Police Allowance

1. Payment for uniformed police officers will be made for expenses billed to the Contractor by the Police Department in the normal course of providing supervision for traffic control during construction operations. Traffic control when required by the Chief of Police will be paid under this item. Allowance is approximate, and the actual amount to be paid may be more or less but shall match the actual amount paid to the traffic police as authorized by the Engineer. The Contractor shall record the actual amount paid to traffic police and at the end of each month he shall submit the total amount paid during the month, in four copies, to the Engineer who will review such amounts, when verified, in monthly payment requests from the Contractor to the Owner.

2. If the police expenses are greater than the stated allowance, the Contractor will be reimbursed the difference in the actual costs as billed. Any unexpended amount will remain with the Owner as a credit on the total base bid.

3. No mark-up for Item 11 will be allowed. Only documented police invoice amounts will be reimbursed to the Contractor. No payment will be allowed for police details ordered but not utilized due to cancellation of work crews.

4. All traffic control measures must be in accordance with Section 01850 of the specifications.

M. Item 12: Mobilization and Demobilization

1. Measurement for payment of mobilization and demobilization costs shall be on a lump sum basis but the cost shall not exceed 5 percent of the total of bid Items 1-11, and A-13 (if applicable) inclusive.

2. Payment of the lump sum price bid in the Bid Form for Item 12 shall be full compensation for all costs associated with initiation and closeout of the Contract, exclusive of the cost of materials, with 50% payable on completion of mobilization. Payment shall include compensation for all insurance, bonds, site preparation, construction equipment delivery, and in general the costs associated with establishing and terminating the work on site. There shall be no additional costs for any remobilization.

N. Item A-13: Codjer Lane and Union Street Connection

1. Under the lump sum price for this Item, the Contractor shall provide construction services and furnish appurtenances necessary to complete the connection at Codjer Lane and Union Street as detailed in the Drawings.

2. Connection shall include 16” DI pipe, a 16” gate valve, a 16”x12” tee, and other required fittings.

3. Payment will also be considered full compensation for furnishing all labor, equipment, materials, and services required or incidental for the satisfactory completion of the work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01024

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SECTION 01040

PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

1. Coordination.

2. Administrative and supervisory personnel.

3. General installation provisions.

4. Cleaning and protection.

B. Progress meetings and preconstruction conferences are included in Section 01200 – Project Meetings.

C. Requirements for the Contractor's Construction Schedule are included in Section 01300 - Submittals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Inspect the conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner, and at no additional cost to the Owner.

B. Manufacturer's Written Instructions: Comply with manufacturer's written installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items, and at no additional cost to the Owner.

D. Provide attachment and connection devices and methods for securing work. Secure work true to line and level. Allow for expansion and utility movement.

E. Recheck measurements and dimensions before starting installation or erection.

F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material to prevent deterioration.

G. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Install protective covering to ensure protection from damage or deterioration.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period.

C. Contractor shall be required to sweep public and private roadways to remove all materials related to project activities. The frequency of sweeping shall be based on the condition of the affected roadway.

D. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Air contamination or pollution.
5. Water or ice.
6. Solvents.
7. Chemicals.
8. Heavy traffic.
9. Misalignment.
10. Unprotected storage.
11. Improper shipping or handling.
12. Theft.
13. Vandalism.

END OF SECTION 01040

SECTION 01046

CONTROL OF WORK

PART 1 – GENERAL

1.1 EQUIPMENT

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

1.2 HOURS OF CONSTRUCTION

A. Normal construction activity shall take place only between the hours of 7 a.m. to 4 p.m., excluding Saturdays, Sundays, and legal holidays. Work outside the above time periods will be permitted only on an emergency basis and only with the approval of the Owner.

B. Work in streets, roadways, and areas adjacent to them shall cease at noon on days before legal holidays and at noon on Fridays prior to Monday holidays.

1.3 OCCUPYING PRIVATE LAND

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

1.4 HAULING, HANDLING, AND STORAGE OF MATERIALS

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

1.5 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, fences, guardrails, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. The Contractor is required to comply with all provisions of General Laws Chapter 353, entitled "Excavations-Public Ways-Notice Requirements", otherwise known as DIGSAFE. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.

B. Assistance will be given the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including, but not limited to existing water services, drain lines, sewers, and duct banks). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.

C. Protection and temporary removal and replacement of existing utilities and structures, as described in this Section, shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit prices established in the Contract.

D. The Contractor shall comply with the requirements of the Commonwealth of Massachusetts Statute – Chapter 82, Section 40, for excavations in public and private property.

E. The Contractor shall notify Massachusetts Dig Safe (1-888-344-7233) at least 72 hours before digging, trenching, blasting, demolishing, boring, backfilling, grading, landscaping, or other earth moving operations in any public ways, rights of way and easements.

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

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

(excluding Saturdays, Sundays, and legal holidays) before excavating in any public way.

1.6 DISTRIBUTION SYSTEM AND SERVICES

A. The Contractor shall interrupt water services and disrupt the normal functioning of the distribution system as little as possible. He shall notify the Owner and Engineer 48 hours in advance of any requirement for unwatering or isolating a section of the main, so that water customers may be notified and the necessary arrangements may be made with the Water District and the Fire Department. The impacted homeowners shall receive written notification a minimum of 72-hours prior to any interruption of service. The Owner reserves the right to limit the amount of system piping that may be shut down at any one time.

B. When water or fire services are to be interrupted for an extended period (longer than 8 hours), the Contractor will provide temporary services lines. Inconvenience of water users shall be kept at a minimum. The safety and integrity of the system is of prime importance in scheduling work.

C. If required, the Owner will remove existing service connection meters to allow temporary service connections to be made by the Contractor.

D. Water service locations and sizes shall be obtained from the available Water District records as required.

1.7 PIPE LOCATIONS

A. Pipelines shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him/her from laying and jointing different or additional items where required. Additional fittings ordered by the Owner or Engineer shall be paid for under the additional fittings bid item.

1.8 DIMENSIONS OF EXISTING STRUCTURES

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

1.9 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/her own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street and requiring that the trench shall not remain open overnight.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.

C. Contractor shall obtain proper trench permits as required by M.G.L C.82A and Title 520 of the CMR.

D. Open trenches must be backfilled at the end of each work day.

1.10 TEST PITS/EXPLORATORY EXCAVATION

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor at the direction and approval of the Engineer. Test pits shall be backfilled and compacted immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.

1.11 MAINTENANCE OF TRAFFIC

A. Unless permission to close a street is received in writing from the proper authority, all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he/she shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.

B. Detours around construction will be subject to the approval of the Owner and the Engineer. Where detours are permitted the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured the Contractor shall expedite construction operations and periods when traffic is being detoured will be strictly controlled by the Owner.

C. The Contractor shall take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.

D. When, in the opinion of the Police Department, public safety requires the services of police, the Safety Officer may direct the Contractor to provide manpower to direct traffic within the location of work under this Contract.

E. Under normal circumstances the Owner shall coordinate the scheduling of all police activities, however, when so directed, the Contractor shall make all arrangements in obtaining the manpower and all invoices for policing.

F. The intent is to insure public safety by police direction of traffic. Police are not to serve as watchmen to protect the Contractor's equipment and materials, or to warn pedestrians of such hazards as open trenches.

G. Nothing contained herein shall be construed as relieving the Contractor of any of his/her responsibilities for protection of persons and property under the terms of the Contract.

H. Contractor shall furnish and maintain traffic control signage throughout the project and at all construction areas. Signs shall be standard signs in compliance with Massachusetts Highway standards. In general the following signs and devices shall be placed and maintained at each side of all work areas:

1. One Lane Road Ahead - 1000 feet
2. Police Officer Ahead - 500 feet
3. Keep Left/Keep Right
4. End Construction
5. Left/Right Lane Closed Ahead
6. Safety Barrels with flashers
7. Detour Ahead
8. Detour (as required)

I. It is the intent of this contract that traffic be maintained at all times in the areas of construction. The contractor may be required to halt operations and/or transport material to areas beyond immediate work locations in order to allow minimum traffic disruptions. Access to the site by emergency vehicles, school buses and residents shall be maintained at all times.

J. The contractor shall be responsible for providing property owners with written notification of proposed construction which may require detours or road closures.

1.12 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly-constructed work shall be carefully protected from injury in any way. No placing of heavy loads on it shall be allowed, and all portions injured shall be reconstructed by the Contractor at its own expense.

B. All structures shall be protected in a manner approved by the Engineer. All such damaged portions of the work shall be completely repaired and made good by the Contractor, at his own expense, and to the satisfaction of the Engineer.

C. If, in the final inspection of the work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship, without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction, and other work undertaken herein, for at least the guarantee period described in the Contract Documents.

D. The Contractor shall take all necessary precautions to prevent damage to any work during and after construction, and until such work is accepted and taken over by the Owner.

1.13 CARE AND PROTECTION OF PROPERTY AND SURVEY MONUMENTS

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

B. Along the location of this work, all fences, walks, bushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the Contractor shall be replaced in the location indicated on the Drawings as soon as conditions permit. All grass areas beyond the limits of construction, which have been damaged by the Contractor, shall be graded and seeded at the Contractor's expense.

C. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any trees be cut or removed without prior notification of the Owner or other person in charge. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods using only approved tools and materials.

D. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the Bid Proposal. The Contractor is responsible for protecting and, if required, re-setting survey monuments (bounds). If a bound is in the way of required excavation, the Contractor will notify the Engineer/Inspector and/or the town Engineering Division with as much notice as possible prior to performing excavation near the bound.

1.14 REJECTED MATERIALS AND DEFECTIVE WORK

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

1.15 COORDINATION WITH LOCAL AGENCIES

A. The Contractor shall attend a Pre-Construction Meeting to be held at the Office of the Water District approximately one week prior to start of work. Town departments who will also be invited to this meeting include Police, Fire, School, Planning, and Conservation. Electric, gas and phone utility companies will also be invited. The contractor will provide the proposed schedule at that time (see Submittals, Section 1300). Any proposed detours will be reviewed with all parties at the Pre-Construction Meeting. If any additional detours are considered after the Pre-Construction Meeting, the Contractor must first get approval from the Engineer.

B. The Contractor will immediately notify the utility owner of any utility main breaks. In the case of Owner water, the emergency contact number for the Sudbury Water District during business hours is 978-443-6602.

C. The Contractor will be required to reimburse the Owner for the actual cost of the services of Water District Personnel required during other than regular working hours. This includes the cost of the Engineer/ Site Inspectors when inspection is required outside the normal business hours. This cost shall be at the rate of time and one-half of the Inspector's pay rate, to be paid to the Owner by the Contractor.

D. The Contractor shall notify the Sudbury Water District at least 72 hours prior to the construction of any public improvement so that the Owner can have an inspector present if work requires inspection. In general, inspection will be required:

1. For Road Construction:

a. When the subgrade is established,

b. while placing gravel,
c. when final grade of base course is established, and
d. during paving operations.

2. For Drainage, Water and Sewer Construction:

a. While laying pipe, but before backfilling, and
b. during backfilling operations. (In the case of water main installations, final pressure test will be monitored by the Engineer after dissinfection tests have been successfully completed.)
c. during paving operations.

E. The Engineer will have the authority to reject any work or materials that do not constitute approval by the Owner and shall not relieve the Contractor of his obligations to perform the work in accordance with the Plans and Specifications.

F. The Contractor shall maintain pavement as specified in Section 02576 and shall provide the Owner with contact information at which he/she can be contacted when he/she is not at the site. Upon notification by the Owner or the Engineer the Contractor shall promptly make repairs to the construction site as may be necessary.

G. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, curbing, electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him/her at his/her expense.

H. Assistance will be given the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.

I. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the Total Price Bid in the Bid Form.

J. The Contractor shall coordinate the removal and replacement of traffic loops and signals, if required for the performance of the work, at no additional cost to the Owner.

K. If, in the opinion of the Engineer, permanent relocation of a utility owned by the Owner is required, he/she may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work under Article 11 of the Supplementary Conditions. If relocation of a privately owned utility is

required, the Owner will notify the Utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner and the Utility and shall have no claim for delay due to such relocation. The Contractor shall notify all utility companies in writing at least 72 hours (excluding Saturdays, Sundays and Legal holidays) before excavating in any public way. Contractor shall also notify Massachusetts Dig Safe, telephone 1-800-322-4844 at least 72 hours prior to start of work.

1.16 WATER FOR CONSTRUCTION PURPOSES

A. In locations where water is in sufficient supply, the Contractor may be allowed to purchase water for jetting backfill, testing, startup, and other construction purposes. The express approval of the Owner shall be obtained before water is used. Water shall be metered as specified by the Town. Hydrants shall only be operated by Sudbury Water District personnel.

B. The Contractor shall furnish all water required for and in connection with work to be done under this Contract including but not limited to: water for cleaning and testing all pipelines, manholes and structures: temporary potable water: sanitation and toilet facilities: disinfection: and including water for curing, heating, chemical mixing and testing for the permanent pipeline liner rehabilitation system.

C. No direct cross connections will be permitted between the public water supply and the new water mains, or any other point where the possibility of backflow of contaminated water exists. All connections to pointes where there is a possibility of backflow shall be arranged to prevent backflow and shall be approved by the Town's Plumbing Inspector before they are put into operation.

D. No separate measurement and payment shall be made for temporary water and all costs shall be incidental to and included with each applicable item.

1.17 MAINTENANCE OF FLOW

A. The Contractor shall maintain the flow in all watercourses, whether open channels or in pipes, in all sewers and other pipes interfered with in the line of work and convey the flow to a suitable point of discharge so as not to flow upon the work or create a nuisance. In the discharge of water removed from the excavations by pumping or by gravity similar precautions shall be observed.

1.18 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with General Contractor and his/her Subcontractors or trades and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

1.19 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the work, the Contractor shall keep the site of his/her operations in as clean and neat a condition as is possible. He/She shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he/she shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and shall leave the entire site of the work in a neat and orderly condition.

B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor and his/her subcontractors shall comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and elsewhere in the Specifications.

C. The Contractor is advised that the disposal of excess excavated material in wetlands, stream corridors and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him, will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. Therefore, the Contractor will be required to remove the fill at his/her own expense and restore the area impacted.

D. Outdoor burning of rubbish and waste material on the site will not be permitted.

E. Disposal of volatile fluid wastes (such as mineral spirits, oil, gasoline, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

F. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.

1.20 INTERRUPTION OF WATER SERVICE

A. The Contractor shall plan his work and shall follow a procedure so as not to inconvenience the general public.

B. All affected customers shall be notified with a minimum of 24 hours notice prior to interruption of water service. Residential notification cards shall be obtained from the Water District Office. It shall be the Contractor's responsibility to request and obtain the Residential notification cards from the Water District.

C. A list of all recipients of notices will be provided to the Water District immediately.

D. Failure to comply with notification requirements may result in temporary termination of work until such time that notification is issued. Such termination of work will not be reason for extending contract time limits (see Articles 3 & 7 of the Agreement).

E. The 24 hour notice requirement is for planned interruptions. Unplanned interruptions require immediate notification of the Sudbury Water District 978-443-1042. Unplanned interruptions are those that could not possibly have been foreseen. Interruptions such as failure of an isolation valve to provide a tight seal when there are personnel such as the Engineer or other Water District staff who could provide information as to the reliability of a valve are considered interruptions that should be planned.

END OF SECTION 01046

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SECTION 01063

MISCELLANEOUS REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 INTERFERENCE WITH EXISTING WORKS

A. The Contractor shall at all times conduct his operations so as not to interfere with existing works. The Contractor shall develop a program, in cooperation with the Engineer and Owner, which shall provide for the construction and putting into service of the new works in the most orderly manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted. All work of connecting with, cutting into, and reconstructing existing pipes or structures shall be planned to interfere with the operation of the existing facilities for the shortest possible time when the demands on the facilities best permit such interference, even though it may be necessary to work outside of normal working hours to meet these requirements. Before starting work which will interfere with the operation of existing facilities, the Contractor shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand. The Contractor shall make such minor modifications in the work relating to existing structures as may be necessary, without additional compensation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01063

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SECTION 01095

REFERENCE STANDARDS AND DEFINITIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

C. Directed: Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Engineer, requested by the Engineer, and similar phrases.

D. Approve: The term approved, when used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation: The term regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the work.

F. Furnish: The term furnish means supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. Install: The term install describes operations at the project site, including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. Replace: The term replace means dismantle, remove, and dispose of existing equipment and materials and furnish and install new specified item.

I. Provide: The term provide means to furnish and install, complete and ready for the intended use.

1. The term experienced, when used with the term Installer, means having a minimum of five previous projects similar in size and scope to this project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

2. Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such a carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

J. Project Site is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the project is to be built.

K. Testing Agencies: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the Engineer for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Engineer for a decision before proceeding.

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

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

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

ACI
American Concrete Institute
P.O. Box 19150
Detroit, Michigan 48219-0150
Telephone: (313) 532-2600

Al
Asphalt Institute
Research Park Drive
P.O. Box 14052
Lexington, Kentucky 40512-4052
Telephone: (606) 288-4960

ANSI
American National Standards Institute
11 West 42nd Street
13th Floor
New York, New York 10036
Telephone: (212) 642-3300

ASTM
American Society for Testing and Materials
1916 Race Street
Philadelphia, Pennsylvania 19103
Telephone: (215) 299-5400

AWWA
American Water Works Association
6666 West Quincy Avenue
Denver, Colorado 80235
Telephone: (303) 794-7711

MSS
Manufacturers Standardization Society of
the Valve and Fittings Industry
127 Park Street, N.E.
Vienna, Virginia 22180
Telephone: (703) 281-6613

NAPA National Asphalt Pavement Association
6811 Kenilworth Avenue
Calvert Building
Suite 620
Riverdale, Maryland 20737
Telephone: (301) 779-4880

NFPA National Fire Protection Association
One Batterymarch Park
Quincy, MA 02169
Telephone: (617)- 770-3000

WSC Water Systems Council
600 South Federal Street
Suite 400
Chicago, Illinois 60605
Telephone: (312) 922-6222

F. Federal Government Agencies: Names and titles of Federal Government standard- or specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or specification-producing agencies of the Federal Government. Names and addresses are subject to change and are believed, but not assured, to be accurate and up-to-date as of the date of the Contract Documents.

CFR Code of Federal Regulations
(available from the Government Printing Office)
North Capitol Street between G and H Streets, N.W.
Washington, D.C. 20402
Telephone: (202) 783-3238

(Material is usually first published in the "Federal Register)

EPA Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460
Telephone: (202) 382-2090

NIST National Institute of Standards and Technology
(U.S. Department of Commerce)
Gaithersburg, Maryland 20899
Telephone: (301) 975-2000

OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
Government Printing Office
Washington, D.C. 20402
Telephone: (202) 523-6091

1.4 GOVERNING REGULATIONS AND AUTHORITIES

A. The Engineer has contacted authorities having jurisdiction where necessary to obtain information to prepare Contract Documents. Contact authorities having jurisdiction directly for information and decisions regarding the work.

Sudbury Water District
Telephone: 978-443-6602

1.5 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, warranties, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01095

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SECTION 01110

ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. The work covered by this section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environmental for aesthetic and/or recreational purposes.

B. The Contractor's Construction Period Stormwater Pollution Prevention Plan (SWPPP) should outline the means/methods for ensuring the environmental protection procedures outlined herein are complied with. This shall include designating and outlining responsibilities for inspections/monitoring of Environmental Protections.

C. The control of environmental pollution requires consideration of air, water, and land, and involves management of noise and solid waste, as well as other pollutants.

D. The Contractor shall take specific precautions during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens and calcium chloride into the supplies and surface waters of the State.

E. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.

F. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.

G. Schedule and conduct all work in a manner that will minimize the level of noise escaping the site, especially at night and on weekends.

H. All phases of sedimentation and erosion control shall comply with and be subject to the approval of the Massachusetts Department of Environmental Protection.

I. The Contractor is responsible for preparing and submitting all applicable regulatory construction permits required to perform the work.

J. Contractor shall be responsible for maintenance of the erosion control structures and devices, and replacing as needed to maintain the required protection and performance.

1.2 RELATED DOCUMENTS

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

B. Related sections include the following:

1. Section 02020 – Erosion and Sediment Control
2. Section 02200 – Earthwork

1.3 APPLICABLE REGULATIONS

A. Comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

1.4 NOTIFICATIONS

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

1.5 IMPLEMENTATION

A. Prior to commencement of the work, meet with the Engineer to develop mutual understandings relative to compliance with this provision and administration of the environmental pollution control program.

B. Remove temporary environmental control features, when approved by the Engineer, and incorporate permanent control features into the project at the earliest practicable time.

PART 2 – PRODUCTS

2.1 EROSION CONTROLS

A. Filter sock as shown on the Drawings to be used for run-off control to protect adjacent wetlands and other environmentally protected areas.

B. Non-woven Filter Fabric or Silt Sacks to be used where inserted into existing catch basins to prevent siltation of the existing drainage system, as necessary.

C. Where silt fence is required, provide the following woven geotextile fabric for silt fence:

1. Amoco 2122 as manufactured by Amoco Fabrics and Fibers Co., Atlanta, GA.

2. Mirafi 100X as manufactured by Mirafi, Pendergrass, GA.

3. Geotex 910SC as manufactured by Synthetic Industry, Chattanooga, TN.

4. Or acceptable equivalent product.

2.2 MATERIALS

A. Physical Properties of Minimum Average Roll of the woven geotextile fabric for silt fence shall be:

B.

	Property	ASTM Test Method	Units	Value
1.	Grab Strength	D4632	lbs [N]	100 [450](min.)
2.	Permissivity	D4491	sec - 1	0.10 (min.)
3.	Apparent Opening Size	D4751	Sieve #	20-30
4.	Ultraviolet Stability	D4355	%	70 (min.)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install sedimentation barriers in all locations as directed, surrounding base of all deposits of stored excavated material outside of disturbed area, and where directed by the Engineer.

B. Install all erosion controls and environmental protection measures in accordance with manufacturer's printed instructions.

C. Overlap silt fence 18 inches minimum for unsewn lap joint. Overlap fabric 6 inches at seam for sewn joint.

D. Construct earth berms or diversions to intercept and divert runoff water from critical areas.

E. Protect catch basins and drainage swales from sedimentation by installing inlet protection under catch basin grating casting as shown on the Drawings.

F. Do not place excavated soil material adjacent to water-course in manner that will cause it to wash away by high water or runoff.

G. Prevent damage to vegetation by excessive watering or silt accumulation in the discharge area.

H. Do not dump spoiled material into any streams, wetlands, surface waters, or unspecified locations.

I. Prevent indiscriminate, arbitrary, or capricious operation of equipment in streams, wetlands or surface waters.

J. Do not pump silt-laden water from trenches or excavations into surface waters, streams, wetlands, or natural or man-made channels leading thereto.

K. Prevent damage to vegetation adjacent to or outside of construction area limits.

L. Do not dispose of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in streams, wet-lands, surface waters, or natural or man-made channels leading thereto, or unspecified locations.

M. Do not alter flow line of any stream unless indicated or specified.

N. Clean and dispose of debris from sedimentation barriers on a weekly basis.

O. Upon completion of work and upon approval of Engineer, remove and legally dispose of sedimentation barriers and environmental protection measures.

3.2 PROTECTION OF WETLANDS RESOURCE AREAS

A. Care shall be taken to prevent or reduce to a minimum any disturbance to the adjacent wetlands, drainage ditch, surface water body, storm drain or sewer from pollution by debris, sediment, or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the receiving body shall not be directly returned to the surface water body. Such water will be diverted through a settling basin or filter before being directed into the surface water body.

B. The Contractor shall not discharge water from dewatering operations directly into a wetland, surface water, or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels. All dewatering discharges shall also include energy dissipation to prevent scouring.

C. All preventative measures shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action drawing or plan approved by the Massachusetts Department of Environmental Protection. Contractor shall submit two copies (2) of approved contingency drawings or plans to the Engineer.

D. Equipment refueling operations must take place in a supervised area with appropriate secondary containment measures in place and spill response materials accessible on-site for the duration of construction.

3.3 PROVISIONS FOR CONTROL OF EROSION

A. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented.

B. Disposal of drainage shall be in an area approved by the Owner. The Contractor shall prevent the flow or seepage of drainage back into the drainage area. Drainage shall not be disposed of until silt and other sedimentary materials have been removed. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.

C. As a minimum, the following shall apply:

1. Silt fence shall be provided at points where drainage from the work site may contain polluting substances. The point of control shall be within the limits of the new construction and shall be contained in such a way as to not allow sediment to pass. Other methods which reduce the sediment content to an equal

or greater degree may be used as approved by the Engineer.

2. Drainage leaving the site shall flow to water courses in such a manner to prevent erosion.

D. Measures for control of erosion must be adequate to assure that turbidity in the receiving water will not be increased more than 10 standard turbidity units (s.t.u.), or as otherwise required by the State or other controlling body, in waters used for public water supply or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 s.t.u. unless otherwise permitted.

3.4 PROTECTION OF STREAMS

A. Care shall be taken to prevent, or reduce to a minimum, any damage to any stream from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Such waters will be diverted through a settling basin or filter before being directed into the streams.

B. The Contractor shall not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.

C. All preventative measures shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Massachusetts Department of Environmental Protection.

D. Water being flushed from structures or pipelines after disinfection, with a Cl_2 residue of 2 mg/l or greater, shall be treated with a dechlorination solution, in a method approved by the Engineer, prior to discharge.

3.5 PROTECTION OF LAND RESOURCES

A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.

B. Outside of areas requiring earthwork for the repair of the existing facilities, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to

any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.

C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment, dumping or other operations, protect such trees by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly before beginning operations near them.

D. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition. The Engineer will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of.

E. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in. in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

F. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer shall be immediately removed and replaced.

G. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.

H. The locations of the Contractor's storage, staging and other construction building, required temporarily in the performance of the work, shall require written approval of the Engineer and shall not be within wetlands or floodplains. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of the work. Drawings showing storage facilities and staging shall be submitted for approval by the Engineer.

I. If the Contractor proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he/she shall submit the following for approval at least ten days prior to scheduled start of such temporary work.

1. A layout of all temporary roads, excavations and embankments to be constructed within the work area.

2. Details of temporary road construction.

3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.

4. A landscaping drawing showing the proposed restoration of the area. Removal of any trees and shrubs outside the limits of existing clearing area shall be indicated. The drawing shall also indicate location of required guard posts or barriers required to control vehicular traffic passing close to trees and shrubs to be maintained undamaged. The drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the Contractor's approved drawings shall be made only with the written approval of the Engineer. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.

J. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or any other vestiges of construction as directed by the Engineer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be prepared and seeded as approved by the Engineer.

K. All debris and excess material shall be disposed of outside wetland or floodplain areas in an environmentally sound manner.

3.6 PROTECTION OF AIR QUALITY

A. Burning. The use of burning at the project site for the disposal of refuse and debris will not be permitted.

B. Dust Control. The Contractor will be required to maintain all excavations, embankments, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or outside the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.

C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust.

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

3.7 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this Contract, maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

3.8 NOISE CONTROL

A. The Contractor shall make every effort to minimize noises caused by his/her operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with State and Federal regulations.

B. Contractor should note local residences within proximately of the work and shall make all efforts to minimize noise disruptions.

C. Construction activities and operating equipment shall not begin before 7:00 A.M.

END OF SECTION 01110

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SECTION 01170

SPECIAL PROVISIONS

PART 1 – GENERAL

1.1 GENERAL OBLIGATIONS OF THE CONTRACTOR

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

1.2 SITE INVESTIGATION

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

1.3 CONTRACTOR'S EMERGENCY CONTACT AND RESPONSE REQUIREMENT

A. The Contractor will be required to designate a contact person as well as an emergency response crew who can be notified by the Owner and the Engineer during Contract related emergencies, 7 days a week, 24 hours a day throughout the length of this Contract.

B. The name of the designated person, a daytime contact telephone number, an evening contact telephone number, and a portable cellular telephone number must be furnished to the Owner at the pre-construction meeting. The Contractor must also provide a mobile cellular telephone that will remain at the construction site during the hours of construction. The phone will be in a location that will allow the Contractor to respond to calls as well as the Owner or Engineer.

C. The contact person shall be required to respond to any Sudbury Water District notification in this regard within one hour of such notice by calling 978-443-6602 during normal working hours or the Sudbury Department of Public Safety at 978-443-1042 after hours. Upon being advised by the Sudbury Water District of the

location and nature of the emergency, the Contractor will be required to provide an emergency coordinator or contact at the site within one hour of the initial notification and to mobilize the necessary response crew(s) and have them at the site of the emergency within two hours of the initial notification.

D. The Contractor's failure to comply with the above notification and response requirements shall result in a five-hundred dollar ($500.00) fine for each failure to respond as indicted in 1.3.C. In addition the Contractor shall be liable for any and all damages, liabilities and costs which result from his/her failure to respond to any emergency within the designated time periods. The Owner assumes no responsibility or costs for the Contractor's negligence in complying with these requirements. If the subject fine or other liabilities are not paid by the Contractor upon request, it shall be deducted from any payment(s) which may be due the Contractor by the Owner, solely at the discretion of the Owner.

E. The Contractor shall not use any Owner personnel to fulfill these requirements.

F. This requirement shall be considered an incidental part of the Contract, no matter how many times the Contractor is alerted during this Contract, and no payment will be made for any costs incurred or associated with the emergency contact and response requirements.

1.4 PUBLIC UTILITIES

A. The Contractor shall comply with the requirements of the Commonwealth of Massachusetts Statute - Chapter 82, Section 40, for excavations in public and private property. Compliance shall include the following:

1. The Contractor shall notify public utility companies in writing at least 72 hours (excluding Saturdays, Sundays and legal holidays) but not more than 30 days before excavating in areas where underground utility plant (pipes, cables, manholes, etc) exist.

2. The Contractor shall be responsible for providing the Utility Companies with a schedule of his/her activities in areas where the utilities exist.

3. The Contractor shall immediately notify utility companies of any damage to their utilities resulting from construction operations.

4. The express approval of the Owner shall be obtained before public water is used. Hydrants shall only be operated under the supervision of the Owner's personnel. The water is to be metered. A meter must be attained by the Water Department. The Contractor will be responsible for all associated fees and charges for water use.

B. The Contractor shall notify DIGSAFE at 1-800-322-4844 at least 72 hours before digging, trenching, blasting, demolishing, boring, backfilling, grading, landscaping or other earth moving operations in any public ways, rights of way and easements.

1.5 PERMITS

A. The Contractor shall be required to obtain all necessary permits for proper execution of certain phases of the project. The Contractor shall fill out all forms and furnish all drawings required to obtain the permits. A copy of the approved permit shall be submitted to the Engineer. All fees associated with these permits shall be paid by the Contractor as part of the project. Work shall not commence on any phase of the work requiring a permit until the permit is obtained.

B. The Contractor shall obtain the required street opening permit from the Sudbury Department of Public Works for excavations within the street. There is a permit fee for each street opening. The permit fees shall be at the expense of the Contractor.

1.6 TRAFFIC AT STREET INTERSECTIONS

A. The Contractor shall consult with the Sudbury Police Department to determine requirements for signage and officer details.

B. The Contractor shall minimize interferences with the normal flow of traffic. The Contractor shall take all actions ordered by the Engineer to minimize the disruption of normal traffic flow.

C. The Contractor shall note the proximity of the project to local residential areas and all efforts shall be taken to minimize traffic disruptions.

1.7 TEMPORARY WATER SERVICE

A. Contractor shall notify the Sudbury Water District and the Sudbury Fire Department a minimum of 72-hours in advance of connecting to and/or disconnecting from permanent facilities.

B. Fire hydrants that are removed from service shall be properly identified and marked as out of service. Contractor shall coordinate with the Sudbury Fire Department.

C. Contractor shall be responsible for performing all appurtenant work including but not limited to excavation and backfilling, constructing ramps at driveways and other access ways, replacement of temporary and permanent pavement, restoration of public and private property.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01770

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SECTION 01200

PROJECT MEETINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 COORDINATION WITH THE OWNER

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

1.3 PRECONSTRUCTION CONFERENCE

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

B. Contractor will be notified of the time, date and place where the pre-construction conference will be held.

1.4 PROGRESS MEETINGS WITH ENGINEER

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

B. Within seven days after each progress meeting date, the Engineer will forward copies of the minutes-of-the-meeting to the Contractor.

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01200

SECTION 01300

SUBMITTALS

PART 1 – GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, Samples, Construction Photographs, and Construction Schedules. Additional general submission requirements are contained in the General Conditions. Detailed submittal requirements will be specified in the technical specifications sections.

B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing No. or Detail as applicable. Submittals shall be clear and legible and of sufficient size for sufficient presentation of data.

1.2 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

A. Shop Drawings

1. Shop drawings, as defined in the General Conditions, and as specified in individual work Sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the Work.

2. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

3. The Contractor shall check all subcontractors' shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.

4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements; such measurements shall be made and noted on the drawings before being submitted for approval.

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

B. Product Data

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

C. Samples

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

1.3 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with the Specifications

B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable

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

C. The review and approval of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his/her responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

D. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

E. Project work, materials, fabrication, and installation shall conform to approved shop drawings, applicable samples, and product data.

1.4 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Each submittal, appropriately coded, will be returned within 30 working days following receipt of submittal by the Engineer.

C. Number of submittals required:

1. Shop Drawings as defined in Paragraph 1.2 A: Six copies.

2. Product Data as defined in Paragraph 1.2 B: Three copies.

3. Samples: Submit the number stated in the respective Specification Sections.

D. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contractor identification.

4. The names of:

   a. Contractor

   b. Supplier

   c. Manufacturer

5. Identification of the product, with the specification section number, page and paragraph(s).

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. An 8-in x 3-in blank space for Contractor and Engineer stamps.

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

A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:

   1. as permitting any departure from the Contract requirements;

   2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

   3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor under one of the following codes.

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

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

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

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

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

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.

F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Rejected" until resubmitted. The Engineer may, at his/her option, provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

G. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven working days prior to release for manufacture.

H. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

1.6 DISTRIBUTION

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

1.7 RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings

2. Specifications

3. Addenda

4. Change orders and other modifications to the Contract

5. Reviewed shop drawings, Product Data, and Samples

6. Manufacturer’s instruction for assembly, installation, and adjusting

B. Record information concurrent with construction progress, not less than weekly. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer’s name and product model and number.

2. Product substitutions or alternates used.

3. Changes made by Addenda and modifications.

E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of underground utilities and appurtenances, including fire hydrants, gate valves, and service boxes, referenced to permanent surface structures.

2. Field changes of dimension and detail.

3. Details not on original Contract drawings.

1.8 SCHEDULES

A. Provide all schedules required by Articles 2 and 4, and elsewhere in the General Conditions.

B. The Contractor shall submit a progress schedule before starting any work, in accordance with Article 2 of the General Conditions. The Contractor shall review the progress schedule with the Engineer periodically. Such review shall be made on a monthly basis or more frequently as required by the Engineer. The progress schedule shall be updated as required by the Engineer.

1.9 "OR EQUAL"

A. Should the Contractor seek approval of a product other than the brand or brands named in these specifications, it shall furnish written evidence that such product conforms in all respects to the specified requirements, and that it has been used successfully elsewhere under similar conditions. Where the specified requirements involve conformance to recognized codes or standards the Contractor shall furnish evidence of such conformance in the form of test or inspection reports, prepared by a recognized agency, and baring an authorized signature.

B. Manufacturers' standard data and catalog cut sheets will not be considered sufficient in themselves, and the Engineer will not be responsible for seeking further data from the manufacturer, or for otherwise researching the product. Failure to provide complete data will be cause for rejection of the product.

C. The Contractor shall be responsible for all additional costs including license fees, foundation, piping and electrical work necessary to accommodate the proposed "or equal" equipment. Items which result in a cost reduction shall be presented and a change order reflecting 65% of the cost savings will be prepared and the contract price modified.

1.10 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

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

1.11 GENERAL PROCEDURES FOR SUBMITTALS

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01300

P.E. CERTIFICATION FORM

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

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

_____
P.E. Name

_____
Signature

_____
Address

_____
Contractor's Name

_____
Signature

_____
Title

_____
Address

CHANGE ORDER FORM

For

Codjer Lane and Horse Pond Road

Water Main Improvements

Sudbury, MA

Date: _____ Change Order No.:_____

To: _____

_____

_____

_____

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

Description of Change:

Total Amount of this Change Order: $ _____

Original Contract Price: $ _____

Adjusted Contract Price due to Previous Change Orders: $ _____

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

Change to Contract Time: _____ days

RECOMMENDED BY: _____

_____

Title

ACCEPTED BY: _____

_____

Title

ACCEPTED BY: _____

Sudbury Water District

_____

Title

SECTION 01311

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 FORM OF SCHEDULES

A. Prepare in form of network analysis system using the Critical Path Method.

B. Perform data preparation, analysis, charting and updating in accordance with pertinent recommendations contained in current edition of "CPM in Construction" manual of the Associated General Contractors.

C. The network analysis system shall consist of a detailed network, mathematical analysis and a network diagram.

1. The network diagram shall show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned by the Contractor. The basic concept of a network analysis diagram will be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities.

2. Detailed network activities shown on the network diagram shall include, in addition to environmental protection and construction activities, the submittal for approval of samples and shop drawings, the procurement of critical materials and equipment and their installation and testing.

3. Related activities shall be grouped on the network. The activities on the critical paths shall be highlighted. The network shall be time scaled using units of approximately one-half inch equals one week or other suitable scale approved by the Engineer. Weekends and holidays shall be indicated. Where slack exists, the activities shall be shown at the earliest time they are

scheduled to be accomplished. Sheet size shall be 22" x 34" minimum.

4. The mathematical analysis of the network diagram shall include a tabulation of each activity shown on the detailed network diagram. The following information shall be furnished as a minimum for each activity.

    a. Preceding and following event numbers.
    b. Activity description.
    c. Estimated duration of activities in units of working days (being the best estimate available at time of computation).
    d. Earliest start date (by calendar date).
    e. Earliest finish date (by calendar date).
    f. Scheduled or actual start date (by calendar date).
    g. Scheduled or actual finish date (by calendar date).
    h. Latest start date (by calendar date).
    i. Latest finish date (by calendar date).
    j. Slack or Float.
    k. Monetary value of activity.
    l. Responsibility for activity (Prime Contractor, subcontractors, suppliers).
    m. Manpower required by trade and by total. Graphic representatives will be allowed.
    n. Equipment required.

5. The mathematical analysis shall list the activities in sorts or groups as follows:

    a. By the preceding event number from lowest to highest and then in the order of the following event number.
    b. By the amount of slack, then in order of activity number.
    c. By responsibility in order of earliest start date.

1.4 REVIEW OF SYSTEM

A. Participate in a review and evaluation of the proposed network diagrams and analysis by the Engineer. Revisions necessary as a result of this review shall be resubmitted to the Engineer within 10 days after the conference. Twenty days will be allowed for checking and further action by the Engineer. Progress payments will be withheld pending attainment of a mutually acceptable schedule. The mutually acceptable schedule shall then be the schedule to be used by the Contractor for planning, organizing, directing and executing the Work and for reporting progress. If the Contractor thereafter desires to make changes in his method of operating and scheduling he shall notify the Engineer in writing stating the reasons for the change. If the Engineer considers these changes to be of a major nature he may require the Contractor to revise and submit, without additional cost to the Owner, all of the affected portion of the network diagram and mathematical analysis to show the effect

on the entire project. A change may be considered of a major nature if the time estimated to be required or actually used for an activity or the logic of sequence of activities is varied from the original plan to a degree that there is reasonable doubt as to the effect on the Contract completion date or dates. Changes which effect activities with adequate slack time shall be considered as minor changes, except that an accumulation of minor changes may be considered as a major change when their cumulative effect might affect the Contract completion date.

1.5 UPDATES

A. Submit at intervals of 30 days a report of the actual construction progress by updating the mathematical analysis. All contract changes, including pending and approved change orders and field orders shall be included in the update schedule. Revisions causing changes in the detailed network shall be noted on the network or a revised issue of the affected portions of the detailed network furnished. The network shall be revised as necessary for the sake of clarity.

B. The report shall show the activities or portions of activities completed during the reporting period and their total value as basis for the Contractor's periodic request for payment. Coordinate with the schedule of breakdown of lump sum items. The report shall state the percentage of the Work actually completed and schedule as of the report date and the progress along the critical path in terms of days ahead or behind the allowable dates. If the project is behind schedule, progress along other paths with negative slack shall be reported. Percentage of work actually completed will be reviewed by the Engineer. If the Contractor fails to submit the required monthly reports and updates within the time prescribed, the Engineer may withhold approval of progress payment estimates until such time as the Contractor submits the required reports and updates. Three copies of the report shall be submitted for each update.

C. Simultaneously submit a narrative report with the updated analysis which shall include but not be limited to a description of the problem areas, current and anticipated delaying factors, their impact, and an explanation of corrective actions taken or proposed.

1.6 SUBMITTALS

A. Within 15 days after execution of the AGREEMENT, submit 3 copies of a preliminary schedule indicating planned operations during first 60 days. Include cost of activities expected to be completed before submission and approval of the complete schedule.

B. Within 30 days after execution of the AGREEMENT, submit 3 copies of the complete network analysis system. After review, submit 3 copies of the mutually acceptable system.

C. Submit 3 copies of monthly reports and updates by the tenth day of the month.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01311

SECTION 01350

HEALTH AND SAFETY PLAN

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall, prior to the start of work on the site, prepare and submit for review, a site-specific health and safety plan. Work may not proceed at the project site until the Owner and/or Engineer have reviewed and approved the Contractor's health and safety plan. Any delays incurred by the Contractor relating to reviews of the health and safety plan shall be the responsibility of the Contractor and constitute no additional costs or claims to the Owner.

B. Individuals involved in the excavation of potentially impacted soils shall be properly informed and trained in the recognition and response strategies involved with the hazards posed by these contaminants. The excavation of contaminated soils areas is not anticipated. However, the Contractor shall provide appropriate equipment (e.g., temporary fencing, drums) in the event hazardous materials are spilled or encountered.

C. The Contractor shall be cognizant of the minimum standards set forth in OSHA 29 CFR 1910.120. The health and safety plan shall include, but not be limited to the following:

1. Identification of Contractor's Site Safety Officer.

2. Identification of Contractor's Designated Field Personnel.

3. Type of Medical Surveillance Program.

4. Identification of Hazard and Risks Associated with Project.

5. Contractor's Standard Operating Procedures including Personnel Training and Field Orientation; Personal Hygiene Requirements & Guidelines; Field Monitoring Requirements of Site Contaminants; Respiratory Protection Training & Requirements; Levels of Protection and Selection of Equipment Procedures; Zone Delineation of the Project Site; Site Security and Entry Control Procedures; Contingency and Emergency Procedures; and Listing of Emergency Contacts.

6. The Contractor must be aware of site specific requirements such as site security during non-working hours, limited work space, and minimizing the effects of soil excavation to adjacent structures.

7. The Contractor shall make available complete sets of personal protective

equipment and clothing to the Owner and Engineer for use during site inspections by the Owner and Engineer. These shall be supplied and maintained at no cost to the Owner, and shall be returned to the Contractor upon completion of the Work, except for expendable disposal protective clothing. Contractor shall provide a repository for collection of disposable health and safety materials. Collection and disposal of contaminated expendable supplies shall be at cost to the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01350

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the following:

1. Provide schedule of values covering each lump sum bid item.

1.3 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTAL PROCEDURES:

1. Schedule of values.

a. Revise and resubmit schedule until acceptable to the Engineer.

2. Itemize separate line item cost for work involving each lump sum item.

a. Ensure that the sum of the items listed in the schedule of values for each lump sum item equals the price bid for the respective lump sum item.

b. For "Miscellaneous Items", items such as Bond premium and temporary construction facilities may be listed separately in the schedule, provided amounts can be substantiated.

3. Breakdown installed costs into:

a. Delivered cost of product, material, equipment.

b. Total installed cost with overhead and profit.

(1) Do not list overhead and profit as separate items.

(2) An unbalanced schedule of values providing for overpayment

on items of work performed first will not be accepted.

c. For drainage piping and structures, include a breakdown for testing, and putting into service.

1.4 SEQUENCING AND SCHEDULING

A. Prepare schedule of values covering each lump sum item after review of tentative schedule at pre-construction conference, but before submission of first application for payment.

B. Before submitting any application for payment, obtain the Engineer's approval of the Schedule of Values.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01370

SECTION 01400

QUALITY ASSURANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section covers Quality Assurance and Control requirements for this contract.

B. The Contractor is responsible for controlling the quality of work, including work of its subcontractors and suppliers and for assuring the quality specified in the Technical Specifications is achieved.

C. Refer to the Article 7 - Contractor’s Responsibilities, of the GENERAL CONDITIONS.

1.3 TESTING LABORATORY SERVICES

A. All tests which require the services of a laboratory to determine compliance with the Contract Documents shall be performed by an independent commercial testing laboratory acceptable to the Engineer. The laboratory must be certified by the Commonwealth of Massachusetts for the parameters tested and required under the project. The laboratory shall be staffed with experienced technicians, properly equipped, and fully qualified to perform the tests in accordance with the specified standards.

B. Preliminary Testing Services: Unless otherwise specified, the Contractor shall be responsible for all testing laboratory services in connection with concrete materials and mix designs, the design of asphalt mixtures, gradation tests for structural and embankment fills, backfill materials, and all other tests and engineering data required for the Engineer's review of materials and equipment proposed to be used in the Work. The Contractor shall obtain the Engineer's acceptance of the testing laboratory before having services performed, and shall pay all costs for services.

C. Quality Control Testing Services: Perform all quality control tests in the field or in the laboratory on concrete, asphalt mixtures, moisture-density (Proctor) and gradation tests on structural and embankment fills, and backfill materials, in-place field density tests on structural and embankment fills, and other materials and equipment, during and after their incorporation in the Work. Field sampling and testing shall be performed in the general manner indicated in the specifications, with minimum interference with construction operations. The Engineer shall determine the exact time and location of field sampling and testing, and may require such

additional sampling and testing as necessary to determine that materials and equipment conform with data previously furnished by Contractor and with the Contract Documents.

D. Arrangements for delivery of samples and test specimens to the testing laboratory will be made by the Contractor. The laboratory tests shall be performed within a reasonable time consistent with the specified standards. Furnish a written report of each test to the Engineer.

E. Contractor shall furnish all sample materials and cooperate in the sampling and field testing activities, interrupting the Work when necessary. When sampling or testing activities are performed in the field, the Contractor shall furnish personnel and facilities to assist in the activities.

F. The Contractor shall not retain any testing laboratory against which the Owner or the Engineer have reasonable objection, and if at any time during the construction process the services become unacceptable to the Owner, or the Engineer, either the Owner or the Engineer may direct in writing that such services be terminated. The request must be supported with evidence of improper testing or unreasonable delay. If the Engineer determines that sufficient cause exists, the Contractor shall terminate the services and engage a different testing laboratory.

G. Transmittal of Test Reports: Written reports of testing and engineering data furnished by the Contractor for the Engineer's review of materials and equipment proposed to be used in the Work shall be submitted as specified for Shop Drawings.

H. The testing laboratory shall furnish four copies of a written report of each test performed by laboratory personnel in the field or laboratory to the Contractor. Distribution shall be two copies of each test report to the Engineer's Representative, one copy to the Owner, and one copy for the Contractor within three days after each test is completed.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Refer to Article 3 - Documents: Intent, Requirements, Reuse, of the General Conditions.

B. Copies of applicable referenced standards are not included in the Contract Documents. Where copies of standards are needed by the Contractor for superintendence and quality control of the work, the Contractor shall obtain a copy or copies directly from the publication source and maintain at the jobsite, available to the Contractor's personnel, subcontractors, and Engineer.

C. Quality of Materials: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and free from defects and imperfections, when installed or otherwise incorporated in the Work. Material and

equipment shall not be used by the Contractor for any purpose other than that intended or specified unless such use is authorized by the Engineer.

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

1.5 OFFSITE INSPECTION

A. When the specifications require inspection of materials or equipment during the production, manufacturing, or fabricating process, or before shipment, such services shall be performed by an independent testing laboratory, or inspection organization acceptable to Engineer in conjunction with or by the Engineer.

B. The Contractor shall give appropriate written notice to the Engineer not less than 30 days before offsite inspection services are required, and shall provide for the producer, manufacturer, or fabricator to furnish safe access and proper facilities and to cooperate with inspecting personnel in the performance of their duties.

C. The inspection organization shall submit a written report to the Contractor who shall provide copies to the Engineer.

1.6 MATERIALS AND EQUIPMENT

A. The Contractor shall maintain control over procurement sources to ensure that materials and equipment conform to specified requirements in the Contract Documents.

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

1.7 SHOP AND FIELD TESTING

A. The Contractor is also responsible for providing the shop and field testing specified in the technical specification sections.

B. The Contractor and its Subcontractor shall perform inspections, tests, and other services as required by the Contract Documents.

C. Contractor shall provide twenty one days notice to the Engineer so that the Engineer may witness Contractor and/or Subcontractors off site and on site tests. The Engineer's witnessing of tests does not relieve the Contractor and/or Subcontractors of their obligation to comply with the requirements of the Contract Documents.

1.8 MANUFACTURER'S FIELD SERVICES

A. When specified in the technical specifications sections, the Contractor shall arrange for and provide technical representation from manufacturer's of respective equipment, items or components. The manufacturer's representative shall be a factory trained service engineer/technician with the type and length of experience specified in the technical specifications.

B. Services Furnished Under This Contract: An experienced, competent, and authorized factory trained service engineer/technician representative of the manufacturer of each item of equipment for which field services are indicated in the specifications shall visit the site of the Work and inspect, operate, test, check, adjust if necessary, and approve the equipment installation. In each case, the manufacturer's service representative shall be present when the equipment is placed in operation. The manufacturer's service representative shall revisit the jobsite as often as necessary until all problems are corrected and the equipment installation and operation are satisfactory to the Engineer.

1.9 CERTIFICATION FORMS AND CERTIFICATES

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 QUALITY CONTROL

A. Quality control is the responsibility of the Contractor, and the Contractor shall maintain control over construction and installation processes to assure compliance with specified requirements.

B. Certifications for personnel, procedures, and equipment associated with special processes (e.g., welding, cable splicing, instrument calibration, surveying) shall be maintained in the Contractor's field office, available for inspection by the Engineer. Copies will be made available to the Engineer upon request.

C. Means and methods of construction and installation processes are the responsibility of the Contractor, and at no time is it the intent of the Engineer or Owner to supersede or void that responsibility.

END OF SECTION 01400

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 TEMPORARY UTILITIES

A. Temporary Light and Power: The Contractor shall at his own expense, provide his own temporary light and power as required for the prosecution and completion of work.

B. Temporary Heat: The Contractor shall, at his own expense, provide sufficient temporary heat to maintain a minimum temperature of 50 degrees F at all times in all areas designated elsewhere in these documents.

C. Temporary Telephone: The Contractor shall have installed at his own expense a job telephone for his use and for the use of the Engineer. The Contractor shall pay all phone charges.

D. Sanitary Provisions: The Contractor shall provide and maintain sanitary accommodations for the use of his employees and the Engineer, as may be necessary to comply with the requirements and regulations of the local and state departments of health.

E. Maintaining Operation of the Existing Facilities:

1. The Contractor shall be responsible for careful consideration of the construction, scheduling and anticipation of potential interference with existing utilities, operations and structures. The Contractor shall maintain close communications with the Engineer and provide the Engineer with a detailed description of each proposed activity sufficiently in advance of its commencement for review and comments to be made.

2. Temporary facilities which may be required include, but are not limited to, electrical power; lighting; heating; cooling; ventilating; telephone; potable water; fire protection; drainage; sanitary facilities; trench covers; protection of existing utilities; structures; streams; trees and shrubs; access roads; sewage conveyance; piping.

1.3 INTERFERENCE WITH AND PROTECTION OF STREETS

A. Contractor shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefore from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the proper authorities.

B. Streets, roads, private ways, and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore.

C. The Contractor shall, at least 24 hours in advance, notify the Police, Fire and School Departments in writing, with a copy to the Engineer, if the closure of a street or road is necessary. He shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well lighted, in order to minimize confusion.

D. Construction parking shall be allowed only in areas approved by the Owner.

E. Prior to any installation, the Sudbury Water District must have a copy of an approved road opening permit.

F. Directional signs and advance warning signs for vehicular and pedestrian traffic shall be furnished, erected, and maintained throughout the construction period.

1.4 ACCESS TO THE WORK

A. The Contractor shall provide sufficient and proper facilities at all times for inspection of all work under this project in preparation or in progress, by the Owner, the agents and employees of the Owner, by authorized representatives of the State of Massachusetts and the Federal Government and by the Engineers.

B. The Contractor shall furnish the Engineer or his authorized representative and other personnel mentioned above with such facilities and assistance as are necessary to ascertain performance of the work in accordance with the plans and specifications.

1.5 DUST CONTROL

A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of water as necessary, so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use calcium chloride, and it is allowed by local authorities, for more effective dust control, the Contractor shall furnish and apply the material as directed.

B. Calcium chloride shall be commercial grade, furnished in 100 lb, 5-ply bags, stored

under weatherproof cover and stacked alternately for ventilation. Application for dust control shall be at the rate of about 1/2 pound per square yard, unless otherwise directed by the Engineer.

C. Within buildings, the Contractor shall provide suitable materials and methods of dust control, containment, and clean up during construction. Methods, materials, and schedule shall be approved by the Engineer.

1.6 POLLUTION CONTROL

A. The Contractor shall conduct clean-up and disposal operations, as necessary, to comply with state and local ordinances and anti-pollution laws.

B. Outdoor burning of rubbish and waste material on the site will not be permitted.

C. Disposal of volatile fluid wastes (such as mineral spirits, oil, gasoline, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

1.7 PRECAUTIONS DURING ADVERSE WEATHER

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

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

1.8 INSPECTION OF WORK AWAY FROM THE SITE

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

PART 1 - PRODUCTS (NOT USED)

PART 2 – EXECUTION (NOT USED)

END OF SECTION 01500

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SECTION 01610

DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 TRANSPORTATION AND DELIVERY

A. Transport and handle items in accordance with manufacturer's printed instructions.

B. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer.

C. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.

D. Deliver products to the site in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.

E. All items delivered to the site shall be unloaded and placed in a manner which will not hamper the Contractor's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.

F. Provide equipment and personnel to unload all items delivered to the site.

G. Promptly inspect shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by

others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify Engineer verbally, and in writing, of any problems.

1.4 STORAGE AND PROTECTION

A. Store and protect products in accordance with the manufacturer's printed instructions, with seals and labels intact and legible. Storage instruction shall be studied by the Contractor and reviewed with the Engineer by him. Instructions shall be carefully followed and a written record of this kept by the Contractor. Arrange storage to permit access for inspection.

B. Store loose granular materials on solid flat surface in a well-drained area. Prevent mixing with foreign matter.

C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulation of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in manner to reduce breakage, cracking and spalling to a minimum.

D. All mechanical and electrical equipment and instruments subject to corrosive damage by the atmosphere (even though covered by canvas) shall be stored in a weathertight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the Engineer. Building shall be provided with ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01610

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Closeout procedures.

2. Final cleaning.

3. Adjusting.

4. Record Documents.

1.3 RELATED WORK

A. Cleaning up requirements are included in Section 01710.

1.4 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payment, and sum remaining due.

D. Submit all warranties.

E. Submit written notice that all subcontractors and suppliers have been paid in full.

F. Submit written notice showing the disparition of all insurance filings and claims.

G. Copy of "Statement of Compliance" filed with the Division of Labor and Workforce Development, as required under the State Wage Rate Provisions.

1.5 RECORD DOCUMENTS

A. Maintain on site, one set of the following documents; actual revisions to the Work shall be recorded in these documents:

1. Contract Drawings

2. Specifications

3. Addenda

4. Change orders and other Modifications to the Contract

5. Reviewed shop drawings, product data, and samples.

6. Written interpretations and clarifications.

7. Field orders.

8. Field test reports properly verified.

9. Upon completion of the project Record Drawings shall be submitted to the Engineer.

B. Store As-built Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name, address and telephone number and product model and serial number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

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

1. Measured horizontal and vertical location of excavation limits referenced to permanent surface bounds.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension of detail.

5. Details not on original Contract Drawings.

1.6 FINAL CLEANING

A. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

1. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

1.7 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01700

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SECTION 01710

CLEANING UP

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. During its progress, the work and the adjacent areas affected thereby shall be cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.

B. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc., shall, upon completion of the work, be left in a clean and neat condition.

C. On or before the completion of the work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.

D. The Contractor shall thoroughly clean all materials and equipment installed by him and his sub-contractors, and on completion of the work shall deliver it undamaged and in fresh and new-appearing condition. All mechanical equipment shall be left fully charged with lubricant and ready for operation.

E. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01710

SECTION 01850

TRAFFIC MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. The Massachusetts Department of Transportation Construction Standards, most recent version, shall apply to all materials furnished under this section. When conflicts arise between this specification and the Construction Standards, the Contractor shall coordinate with the Owner and/or Engineer for a final decision.

1.2 SUMMARY

A. This section includes the following:

1. Pedestrian, vehicular traffic and other safety control devices, construction signs, requirements, and management for the protection of the traveling public and working personnel during construction and related operations.

2. Establishing, maintaining, and removing detour routes as shown on the Plans or as directed by the Owner and/or Engineer in order to perform the proposed construction.

3. The design, application, and installation of all devices required by this section shall conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) latest edition, Part VI, published by the Federal Highway Administration (FHWA), the Massachusetts Amendments to the MUTCD latest edition, MassDOT Work Zone Safety Guidelines for Massachusetts Municipalities and Contractors, MassDOT Construction and Traffic Standard Details (1996), Americans with Disabilities Act (ADA), and the Massachusetts Department of Transportation Standard Specifications for Highways and Bridges with all subsequent Special Provisions and Supplemental Specifications, hereinafter referred to as the "MassDOT Standard Specifications", Section 850, and MassDOT "Standard Details and Drawings for the Development of Temporary Traffic Control Plans", except as modified herein.

4. Traffic management during construction and maintenance operations includes installing and maintaining temporary vehicular, pedestrian

and construction facilities, furnishing, installing, inspecting, positioning, repositioning, and removing channelization devices necessary to maintain pedestrian and vehicular traffic during construction and fencing of excavations as required for the protection of the public and all project personnel.

5. All construction vehicles not protected by any form of traffic control device on a project which is open to traffic shall have an amber flashing light mounted on the cab roof or on the highest practical point of the machinery. The light shall be in operation whenever the equipment is working on the highway or travelway. Amber flashers must be a minimum of 40 candelas and have a flashing frequency of 50 to 60 times per minute. Either rotating beacons or strobe lights meeting these requirements are acceptable.

6. All materials provided by the Contractor under the items of this section shall remain the property of the Contractor upon completion of the project, unless otherwise specified below.

7. Any traffic management and traffic detours proposed by the Contractor shall be subject to approval by the Owner and/or the Engineer. The Contractor shall provide detailed Traffic Management Plans and detour maps indicating the proposed detour routes, all proposed signs, the proposed hours of operation, the proposed locations of police detail officers and barricades for each phase of construction two weeks before the intended implementation date for approval by the Owner and/or the Engineer. Work shall not proceed without specific notice to and approval of the Owner and/or the Engineer. Any detours or changes in normal traffic patterns or road closures shall be coordinated by the Contractor with the Owner and/or Engineer, local Police Department, and Fire Department.

8. "Approved by the Owner" throughout this Section shall mean the approval of the Sudbury Water District.

1.3 HOURS OF OPERATION

A. Daily restricted hours of operation shall be between 7:00 am and 4:00 pm Monday through Friday. Construction shall be coordinated around other nearby construction projects, and heavy seasonal traffic which may further prohibit construction in the streets during certain periods to retain adequate circulation.

B. The Contractor can request permission for construction on Saturdays during off peak seasons. Such work cannot be performed without permission from the Owner and/or the Engineer.

1.4 SUBMITTALS

A. Shop Drawings: Contractor shall submit the following in accordance with Section 01300 – SUBMITTAL PROCEDURES:

1. Traffic Management Plans: Where designs for pedestrian and traffic control devices are not specifically indicated on the Contract Drawings or for any variations from the Traffic Management Plans on the Contract Drawings, the Contractor shall prepare and submit to the Owner and/or Engineer for approval, a traffic management plan, complete with details of the proposed methods, including materials for approval two weeks before implementation. This includes but is not limited to road closures and detour routes for each phase of construction including time periods of work, temporary pedestrian and construction facilities, locations of signage, portable changeable message signs, police and other traffic control devices to maintain traffic and access to abutting properties.

2. Shop Drawings

a. Submit complete shop drawings for traffic management plans, including temporary pedestrian sidewalks and driveways, as needed, certified by a Professional Engineer registered in the Commonwealth of Massachusetts.

b. Show on the shop drawings all materials, including traffic control devices, signs and methods of installation.

c. Include with the shop drawings alignment tapers, lane widths, police detail locations, temporary pavement markings, barriers and traffic control device spacing.

d. The Contractor shall submit in writing proposed road closures and anticipated detour routes and signage based on the provided information for approval two weeks prior to implementation.

3. Safety Signing for Construction Operations. Where not indicated on the Contract Drawings, the Contractor shall submit temporary traffic management plans and sign placement and size sketches showing the proposed sign setups he intends to use to provide the necessary traffic control and protection during the progress of the work, plus the sign and legend size and layout. These sketches shall also be submitted to the Owner and/or Engineer for review and approval two weeks before work begins. Particular care shall be taken to establish and maintain methods and procedures that will not create unnecessary or unusual hazards to public safety. Traffic control devices required only during working hour operations shall be removed and the appropriate signs

shall be covered at the end of each working day.

4. The Contractor shall submit to the Owner and/or Engineer the information required by this section a minimum of two weeks prior to the start of construction and prior to the start of construction at any new location throughout the duration of work under this contract for approval. Work shall not proceed without specific notice to and approval of the Owner and/or Engineer.

1.5 QUALITY ASSURANCE

A. Provide in accordance with Section 01400.

1.6 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01600 and as specified.

B. No material shall be stored within the work area or on adjacent roadways or residential streets except which is needed for work being performed for that day.

1.7 TRAFFIC CONTROL REQUIREMENTS

A. The Contractor shall meet the following conditions, unless otherwise specifically approved by the Owner and/or Engineer:

1. All work shall be prosecuted with proper regard for the convenience of the public and in a manner to permit unimpeded traffic flow whenever possible. The interruption of traffic will not be permitted unless specifically allowed by the Owner and in accordance with the requirements of the Owner and/or Engineer and in conformance with MUTCD requirements.

2. Traffic control devices and signs shall be removed, demounted or properly covered for those periods of the day not in use or not applicable.

3. The Contractor shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefore from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he/she shall make such repairs or provide such temporary ways or guards without delay that are acceptable to the Owner and/or Engineer.

4. Streets, roads, private ways, and walks under construction and not closed shall be maintained passable and safe at all times by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore.

5. The Owner and/or Engineer shall be notified of any re-routing of traffic two weeks in advance. Approval must be obtained from the Owner and/or Engineer prior to any rerouting of traffic (except emergencies). Following receiving approval form the Owner and/or Engineer, it will be the Contractors responsibility to coordinate with other agencies or departments including Police and Fire Department in writing a minimum of 72 hours prior to road closures. This will include providing the Police Department, Fire Department and Department of Public Works with the following information:

   a. A list of streets and intersections where work will be in progress to be supplied at intervals as required by the Owner and/or Engineer.

   b. Immediate notification of any utility breaks.

6. The Contractor is responsible for notifying abutters of anticipated construction adjacent to their property and the anticipated temporary alterations in circulation through distribution of written notices 72 hours in advance.

7. No operations shall be conducted, including the loading or unloading of vehicles, on or near the traveled lanes or road shoulders without first erecting warning signs and channelizing devices as directed. These precautions shall be maintained at all times while work is in progress.

8. Construction signs and channelizing devices shall be used to separate traffic from the work areas and for traffic control. Placement, other than as shown in the Contract Drawings or the MUTCD, will require prior approval from the Owner and/or Engineer.

9. Temporary signs and channelizing devices shall not be set up until there is adequate visibility or appropriate construction lighting. The Contractor shall schedule his work so that temporary signs and channelizing devices are removed and traffic is returned to its normal pattern before the end of the work period.

9. Work operations shall not be performed on the roadway in such a manner that traffic is obstructed or endangered from either side of the roadway.

10. The Contractor shall keep all roadway areas open to traffic as clear as possible at all times. Materials shall not be stored on any roadway area or within 10 ft. of the traveled way. Material shall be delivered to the installation areas as they are needed to provide a continuous installation. Location of storage areas shall be subject to approval.

11. The Contractor shall remove all equipment and construction vehicles from the traveled way and shoulders open to traffic during non-work hours. Vehicles shall be parked no closer than 10 feet from the traveled way in pre-approved areas unless specifically permitted.

12. Temporary signs and channelizing devices shall not be set up in inclement weather.

13. The Contractor shall provide necessary, unimpeded access for fire apparatus and other emergency vehicles through the work zones to abutting properties at all times.

14. Sweeping and cleaning of surfaces beyond the limits of the project required cleaning up material caused by spillage or vehicular tracking during the various phases of the work shall be considered as incidental to the work being performed under the Contract and there will be no additional compensation. Sweeping and cleaning shall be done daily.

1.8 EXCAVATIONS

A. The Contractor shall excavate for the amount of work to be completed and subsequently backfilled that same day (except for drilling, jacking and receiving pits). Open excavations shall not remain open through non-work hours, unless prior approval is obtained from the Owner and/or Engineer (except for drilling, jacking and receiving pits).

B. All open excavations shall be adequately safe guarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Owner and/or Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, special construction procedures shall be taken, such as limiting the length of open trench.

C. The Contractor shall not enter upon or occupy with men, tools, equipment or materials any property outside the rights-of-way or property of the Owner, except after the written consent of the Owner and/or Engineer.

D. The Contractor shall erect substantial barriers at the ends of open ditches; stockpiled construction materials or other obstructions and shall erect warning signs and provide adequate lights or flares to guard the barriers, trenches, and excavation.

E. At the end of each work day the Contractor shall fill in or cover with steel plates of adequate strength to carry traffic all open trenches, test pits or other excavations. The roadway shall be free of construction debris and excavated material and shall be relatively smooth to provide safe passage.

F. At the end of each work week, backfilled excavations shall be paved with hot mix asphalt in accordance with the Drawings and Section 02576 of these specifications. Temporary paint pavement markings that match the existing markings disturbed by the excavation shall be applied to the new pavement in accordance with the MassDOT Standard Specifications and MUTCD.

1.9 COORDINATION OF WORK AREAS

A. The Contractor shall be responsible for the coordination of his/her work with all utility or roadway work being performed by the District and/or utility owners in relation to this project or projects near this project in order to retain adequate circulation throughout the area. The Contractor shall phase all work in a manner that will provide positive and safe through movement of traffic passing the construction site.

1.10 ACCESS TO PROPERTIES

A. At least one serviceable driveway access to all residences and businesses within the project shall be maintained at all times.

B. The Contractor shall coordinate the work with the schedules of delivery trucks to the adjacent stores and property owners so as not to impede their access.

1.11 HAULING

A. The Contractor is advised that all roads and bridges within or adjacent to the project shall be subject to legal loads and vehicles.

B. The Contractor is advised that no agreements have been made by the Sudbury Water District or MassDOT with surrounding cities or towns to relieve the Contractor of liability for damage to local roads and bridges caused by the Contractor's operation. The Contractor shall contact appropriate officials of the surrounding cities or towns concerning hauling over city or town roads and bridges.

C. The Contractor shall furnish 60" x 30" approved signs reading "CONSTRUCTION VEHICLE - DO NOT FOLLOW" to be used on trucks hauling to the project, when such signs are deemed necessary by the Engineer. The color, type of sheeting and size of lettering shall conform to that of the permanent construction signs.

D. Each driver of any vehicle used on this contract shall have furnished written instructions concerning the manner of operation for that vehicle. Specifically, these instructions shall warn against stopping on the traveled portions of the roadway, against passing other vehicles, and against traveling in close

proximity to other vehicles. A copy of these instructions shall be given to the Engineer.

1.12 DETOUR ROUTE

A. The Traffic Management Plan identifies roadways that may be considered for temporary detour routes. Once specific staged work zones have been established by the Contractor, the Contractor shall submit detour routes and Traffic Management Plans to the Owner and/or Engineer for approval a minimum of two weeks prior to anticipated implementation.

B. The Contractor shall coordinate and time construction with other construction projects nearby to maintain adequate circulation.

C. The Contractor is permitted to install construction signage and other traffic control devices prior to opening the detour. Temporary traffic control devices installed prior to the detour shall be covered or rendered inoperative until the detour begins. Temporary traffic control devices no longer needed after the last day of the detour shall be covered until they are removed.

D. Portable Changeable Message Signs (PCMS) will be in place and operational one week prior to anticipated construction to warn drivers of altered circulation patterns. Locations and messages for PCMS's will be shown on the Contractor's submitted Traffic Management Plans and as approved by the Owner and/or Engineer.

E. The Contractor shall cover all existing traffic signs that are in conflict with the detour route. Existing pavement markings that conflict with detour traffic shall be removed in accordance with the MassDOT Standard Specifications, Section 850.

F. Upon completion of the detour, the Contractor shall restore all pavement markings to the existing conditions and uncover existing traffic signs.

1.13 PEDESTRIAN TRAFFIC

A. Sidewalks shall be maintained at all times throughout the construction period. Temporary sidewalks, pedestrian detours, and pedestrian and construction facilities shall be constructed as needed to maintain pedestrian traffic and business access, as shown on the Plans or as directed by the Owner and/or Engineer. Walkways of 5 feet minimum width (not including curb width) will be provided at all times unless otherwise approved by the Owner and/or Engineer. All permanent and temporary sidewalk construction shall be in accordance with ADA requirements including clearance around obstructions, slopes, and alignments.

B. Pedestrian access will be provided to abutting land uses such as residences and businesses at all times, as approved by the Owner and/or Engineer and in

accordance with ADA requirements.

C. Temporary pedestrian walkways shall be separated from roadway and constructed areas by barricades as approved by the Owner and/or Engineer.

1.14 CONSTRUCTION AND ADVANCE WARNING SIGNS

A. Construction and advance warning signs shall be in accordance with the MUTCD, MassDOT Standard Specifications, Section 850 – Traffic Controls for Construction and Maintenance Operations and the provisions of this Section.

B. Construction and advance warning signs shall be replaced, covered, uncovered, furnished, positioned, repositioned, inspected, maintained, and removed as often as necessary and or directed by the Owner and/or Engineer, including regulatory, warning, and guide signs and temporary bus stop signs and taxi stop signs and their supports.

C. All signs which are damaged or are missing from their location will be replaced by the Contractor without additional compensation.

D. All signs will be maintained by the Contractor in a satisfactory manner including the removal of dirt or road film that causes a reduction in sign retroreflectivity.

E. Special construction signs will be furnished and installed by the Contractor during the work to improve traffic flow or safety, as directed by the Owner and/or Engineer.

1.15 PORTABLE CHANGEABLE MESSAGE SIGN

A. Portable Changeable Message Signs shall be in accordance with the MassDOT Standard Specifications, Section 850 and the provisions of this Section.

B. All messages signs location and displayed shall be submitted by the Contractor to the Owner and/or Engineer two weeks prior to construction for approval.

C. Message signs shall be installed one week prior to detours being in place to warn drivers and shall be kept fully operational by the Contractor throughout the duration of the work.

D. The Contractor shall be responsible for positioning, repositioning, operating, maintaining, revising messages, and removing the message signs as needed or as directed by the Owner and/or Engineer.

1.16 TRAFFIC CONTROL DEVICES

A. Install, inspect, maintain, reposition and remove all temporary traffic control devices and construction elements as often as necessary and as directed by the Owner and/or Engineer in accordance with an approved construction staging sequence and traffic management plan.

B. Materials required for the work of this Section need not be new, but must be in first-class condition and acceptable to the Owner and/or Engineer and meeting requirements set for the MUTCD and MassDOT standards. Any materials, that in the judgment of the Owner and/or Engineer, are unsatisfactory in appearance or performance shall be removed and immediately replaced by the Contractor with acceptable units.

C. All traffic control devices shall be in accordance with MassDOT Standard Specifications, Section 850 and the provisions of this Section.

D. Temporary Safety Signing

1. Safety Signing shall consist of furnishing, positioning, repositioning, covering and uncovering, maintaining and removing, as needed and/or as directed: regulatory, warning, and guide signs together with their supports. If additional supports are needed due to site conditions they will be considered incidental to the work.

2. Any temporary safety sign no longer applicable shall either be removed or covered as soon as possible.

3. No temporary safety sign shall be visible to traffic that may conflict with actual roadway conditions.

4. Signs over 50 square feet will require approval of design calculations and shop drawings of the breakaway support system if the signs are installed at an unprotected location.

5. Site conditions including signage will be returned to pre-construction conditions at the completion of that phase of construction.

E. Sign Covers

1. Cover any existing regulatory and warning signs as necessary and as directed by the Owner and/or Engineer.

2. Use a cover approved by the Owner, which shall be securely fastened to the existing sign and shall completely cover the legend of the existing sign. The cover shall remain in place as long as necessary at which time it shall be promptly removed.

3. Signs shall be covered without causing any damage to the existing sign. Damaged signs will be replaced by Contractor at no additional cost to the Owner.

F. Temporary Pavement Markings

1. Temporary Pavement Markings shall consist of furnishing, applying, maintaining and removing temporary white and yellow reflectorized pavement markings during construction and maintenance operations.

2. Temporary markings shall be effective for a period of 90 days. Re-application or replacement within the 90 day period shall be done at no additional cost to the Owner.

G. Pavement Marking Removal

1. Pavement Marking Removal shall consist of removing existing pavement markings no longer applicable as required to support the Traffic Management Plan through the approved techniques outlined, or as directed by the Owner and/or Engineer.

H. Arrow Board

1. Arrow Board shall consists of providing, operating, positioning, repositioning, maintaining and removing a portable truck-mounted or trailer-mounted flashing arrow unit on the project at designated locations as shown on the approved traffic management plans or as directed.

I. Reflectorized Drums

1. Reflectorized Drums consists of furnishing, positioning, repositioning, maintaining, and removing reflectorized plastic drums and necessary ballast, as needed and/or as directed by the Engineer including locations of lane closures, shifting traffic, road closures, channelizing or otherwise re-directed traffic. The use of cones will not be permitted.

2. Traffic Drums shall conform to Drawing No. TR.7.1 of the MassDOT Construction and Traffic Standard Details, 1996 edition and MUTCD.

J. Pavement Marking Removal

1. Pavement Marking Removal shall consist of removing existing pavement markings as required to support the Traffic Management Plan or as directed through the approved techniques, outlined.

K. Temporary Barrier

1. Temporary Barrier shall consist of furnishing, installing, maintaining and final removal of temporary barriers, including delineation, for traffic control or work zone protection in construction zones. This barrier shall be continuous as a unit across bridges and other limited construction areas unless designated on the plans as "Temporary Restrained Barrier."

2. Vehicular traffic within 30 feet of the travelled way shall not be exposed to blunt ends of barrier without acceptable impact attenuators with delineation.

3. Temporary Barrier shall be removed, transported and reset from the alignments established along the roadway to new alignments as required by the construction and staged construction operations for the control of traffic or work zone protection.

4. Temporary Barrier shall be installed where required by the Owner to protect the work zones and excavations, which cannot be completed and backfilled within a daily work period. Barriers shall be removed when no longer required.

5. Temporary barrier for use for temporary pedestrian and construction facilities shall have three (3) sleeves cast in each section of barrier to receive a post for panel and fence installations.

6. Temporary barrier shall conform to Drawing Nos. E403.1.0 to E403.7.0 of the MassDOT Construction Standard Details dated June 2014 with the latest revision.

L. Temporary Restrained Barrier

1. Temporary Restrained Barrier shall consist of furnishing, installing, removing, transporting, resetting, maintaining and final removal of temporary restrained barriers on bridge decks and other locations including delineation, in accordance with details as shown on the traffic management plans and/or bridge plans and as directed by the Owner and/or Engineer.

2. The work shall also include furnishing and installing all hardware and associated materials necessary to restrain the barriers in position, or attach the barriers to the roadway or the bridge deck.

3. Only barrier systems that have been crash tested and approved by FHWA are acceptable for the intended use.

M. Portable Breakaway Barricades Type III

1. Portable Breakaway Barricades Type III shall consist of furnishing, positioning, transporting, repositioning, maintaining, and final removal of portable barricades as shown on the approved traffic management plan or as directed by the Owner and/or Engineer.

2. Barricades shall be maintained in good and serviceable condition throughout the duration of the Contract.

N. Temporary Impact Attenuators

1. Temporary Impact Attenuators shall consist of furnishing, installing, removing, relocating, reinstalling, maintaining, and final removal of temporary impact attenuators in conformance with the specifications of the manufacturer and MassDOT.

O. Truck Mounted Attenuator

1. Truck Mounted Attenuator shall consist of furnishing a moveable impact attenuator equipped with a flashing arrow board. The impact attenuator can be either a truck-mounted or a tow-behind unit and shall conform with the specifications of the manufacturer and MassDOT.

P. Temporary Fence

1. Temporary fence shall consist of furnishing and installing, removing and resetting and the dismantling of 6-foot high temporary fence to separate construction activities from public access and as determined and required by the Owner and/or Engineer.

2. The temporary fence shall be constructed at locations as directed by the Owner and/or Engineer. The Contractor shall install and maintain temporary construction fences around the construction site, stockpile areas, and any and all exposed excavations located outside the defined roadway area, accessible to the public until such time it is no longer necessary as determined by the Owner and/or Engineer. Carefully protect all areas of the site from intrusion and trespass. Protect Public Health Safety and Welfare at all times.

3. The Contractor is responsible for relocating the fence as many times as required to properly protect construction activities.

1.17 POLICE DETAILS

A. The Contractor shall coordinate with the Owner, Police Department, and Engineer to determine daily uniformed police detail requirements for the

control of pedestrians and vehicular traffic within the project area for each stage of construction.

B. The decision to use a police detail at a specific project location shall be shown on the traffic management plans approved by the Owner and/or Engineer or as directed by the Owner and/or Engineer.

C. Contractor is responsible for scheduling of all uniformed police details. The Police Department will invoice the Owner directly for accepted Police Details.

D. It is the Contractor's responsibility to cancel Police Details a minimum of four hours in advance of the start of the shift if conditions so warrant. The Contractor will be responsible to reimburse the Police when the cancellation notice is not given by the Contractor in a timely fashion. Lateness or failure to show on the part of the Contractor or inclement weather shall not excuse the Contractor from the obligation to give adequate notice to the Police Department. Payment for Police Details not cancelled as required will be the responsibility of the Contractor.

E. Road closures shall not be allowed without prior permission of the Owner, Police Department, and Fire Department.

1.18 PERMITS

A. The Contractor shall be responsible for obtaining any permits to perform the work.

PART 2 - PRODUCTS

2.1. GENERAL

A. Devices required under this Section need not be new but must be in first class condition and acceptable to the Owner and/or Engineer. The condition of the work zone traffic control devices shall meet the quality standards set forth in the Quality Standards for Work Zone Traffic Control Devices compiled by the American Traffic Safety Services Association (ATSSA). Any devices that, in the judgment of the Owner, are unsatisfactory in appearance and/or performance shall be removed and immediately replaced by the Contractor with acceptable devices.

2.2. PORTABLE CHANGEABLE MESSAGE SIGN

A. The Portable Changeable Message Sign shall be capable of performing all functions at ambient temperatures ranging from -31º to 165 º F (–35 º to 74 º C). There shall be no degradation of operation due to fog, rain or snow. A radar detector activator meeting the requirements shall be considered part of this item.

B. Maintenance shall include periodic cleaning. When not being used the sign shall be stored in a secure area approved by the Owner and/or Engineer.

C. The Portable Changeable Message Sign shall consist of the following major components:

1. Message Sign:

a. Type – The technology can be LED or a combination of both Flip Disk and LED (Hybrid).

b. Matrix Displays – Shall be character, line or full matrix.

c. Size – The message sign shall have a minimum height of 6 feet, maximum height of 6.5 feet and a minimum width of 8 feet, maximum width of 12 feet.

d. Colors – The display shall be either fluorescent yellow or ITE amber.

e. Lines – The message sign shall have the capability of displaying at least three lines of 18 inch characters with a minimum of 8 characters per line.

f. The sign shall be illuminated for nighttime visibility.

2. Operator Interface: A means of creating and controlling the display message(s) on–site and remotely through an NTCIP compatible IP addressable modem, shall be provided with each sign. The operator interface shall contain as a minimum the following:

a. Display terminal with keyboard to allow previewing the message content and format before it is sent to the sign panel. The keyboard shall be of a standard design.

b. Controller (CPU).

c. Lockable weatherproof enclosure for interface components.

3. Controller: The Controller shall possess, at a minimum, the following features:

a. Full 32K user memory with the option for additional archive memory.

b. Capacity to store a minimum of 50 messages.

c. Changeable message flash rate capability.

d. A minimum of 24 hour battery back-up.

e. Password activation shall be software available.

4. Power Supply: The sign shall be capable of operation from a diesel powered generator, a battery or solar power. The power supply shall be protected from the weather and be locked for security.

5. Trailer: The trailer shall have at least the following features:

a. A current Registry of Motor Vehicles registration.

b. Swivel jacks capable of leveling the trailer on a 1:6 (1 vertical to 6 horizontal) slope and capable of stabilizing the trailer in winds of up to 80 miles per hour.

c. The sign shall be capable of being locked in a stowed position while being towed.

d. A lift mechanism shall be provided to elevate the sign to its operating position.

e. The capability to lock the sign panel in several off-angle positions with respect to the trailer axis.

2.3. TRAFFIC CONTROL DEVICES

A. Temporary Safety Signing

1. Rigid signs shall be fabricated from plywood, aluminum or approved alternate substrate material.

2. Plywood sign material shall be 5/8 inch Exterior MDO – General (one sided).

3. Aluminum sign material shall be Type A, 0.08 inches thick as specified in MassDOT Standard Specification Subsection 828.42.

4. Route marker overlay on directional sign panels shall be fabricated from Aluminum Alloy 5052-H38 0.08 inches thick.

5. The entire sign face shall be retro-reflectorized. Reflective sheeting shall meet the requirements of ASTM D4956 and AASHTO M268, and as Flexible High Intensity Prismatic (HIP) Sheeting to ASTM Type VII or better.

6. Rollup signs shall be fabricated from vinyl microprismatic

retroreflective material.

7. Background sheeting for all construction warning signs shall be of a fluorescent orange color. The minimum spectral radiance factor, in accordance with Section 5.1 of ASTM E991, for the fluorescence shall be as follows:

New	110% minimum
Weathered	60% minimum

B. Temporary Pavement Markings

1. Glass beads, tapes and paints used for temporary pavement markings shall be lead free, conform to MassDOT Standard Specification, Subsections M7.01.07, M7.01.16, M7.01.23 and M7.01.24, and meet the retroreflectivity requirements of the MUTCD for a period of 90 days. Final determination as to pavement marking quality shall be made by the Engineer. The Contractor shall supply a retroreflectometer for this purpose.

2. The colors of the marking materials shall be the standard highway colors of white or yellow and as outlined in the MUTCD.

C. Arrow Board

1. The unit shall consist of a black background panel meeting the requirements of MUTCD Type C and shall contain at least 15 amber lamps of approximately 8,000 initial maximum candelas each.

2. Panels shall have the capability of the following mode selections: (1) left or right flashing or sequential arrows; (2) left or right sequential chevrons; (3) flashing double arrow; (4) flashing caution and (5) alternating diamond caution.

3. Panels shall automatically provide for a minimum of 50 percent dimming from their rated lamp voltage at night. The flashing rate of the lamps shall not be less than 25 or more than 40 flashes per minute.

4. Minimum mounting height should be 7 feet above the roadway to the bottom of the panel, except on vehicle-mounted panels, which should be as high as practicable.

5. The arrow board shall include a radar detector activator meeting its requirements.

D. Reflectorized Drums

1. Reflectorized drums shall be plastic and shall meet the applicable

requirements of the MUTCD.

2. Reflective sheeting for drums shall meet the requirements of ASTM D4956 and AASHTO M268, and the Flexible High Intensity (H/I) Sheeting for ASTM Type VI and shall be six inches wide.

3. Reflectorized drums are listed on the MassDOT Qualified Construction Materials list.

4. The first five drums used for any taper or as designated on the Traffic Management Plan shall be equipped with flashing lights, or as directed by the Owner and/or Engineer.

E. Temporary Barrier

1. Temporary barriers shall be precast and manufactured in accordance with the plans and Section 629 of the MassDOT Standard Specifications.

2. The Contractor shall supply a barrier and anchorage system that was crash tested in accordance with NCHRP 350, TL-3 or MASH, TL-3 and accepted by FHWA.

F. Temporary Restrained Barrier

1. Temporary restrained barriers for use on roadways or on bridges shall be restrained by blocking or other system, affixed to the roadway by pinning, set into the roadway surface or other tested system or bolted down to the bridge deck, and shall be manufactured in accordance with the plans and Section 629 of the MassDOT Standard Specifications.

2. The Contractor shall supply a barrier and anchorage system that was crash tested in accordance with NCHRP 350, TL-3 or MASH, TL-3 and accepted by FHWA. The Contractor shall provide evidence of FHWA acceptance.

G. Portable Breakaway Barricades Type III

1. Portable Breakaway Barricades shall conform to the plans and the following requirements:

a. Portable breakaway barricades shall comply with the latest version of the MUTCD.

b. Reflectorized sheeting conforming to M9.30.0. Type VI. Pipe shall be Polyvinyl Chloride (PVC) pressure rated SDR 21 or SDR 26 ASTM D2241. Fittings may be PVC ASTM D2665 or

Acrylonitrile Butadiene Styrene (ABS) ASTM D2661 (Drainage Waste and Vent).

c. The alternating 6 inch wide reflectorized diagonal stripe shall be orange and white and shall slope downward at 45º toward the end by which the traffic is to pass. Barricades that block the passage of traffic or designate the end of the traveled way shall have alternating vertical orange and white stripes on the rails.

H. Temporary Impact Attenuators

1. Only those Temporary Impact Attenuators previously approved for the purpose intended and listed on the Qualified Construction Materials List may be used.

2. The temporary impact attenuator shall be designed to fit within reasonably close tolerance of the dimensions given on the plans or in the special provisions for a given location.

3. The Contractor shall provide a design for temporary impact attenuator at the design speed shown on the plans or other speed designated by the Engineer.

I. Truck-Mounted Attenuator

1. Only those truck mounted attenuators previously approved for the purpose intended and listed on the Qualified Construction Materials List may be used. Since most approvals are conditional, any associated issues including but not limited to anticipated conditions, model, variations, modifications, proper installation of truck-mounted units and tow-vehicle specifications shall be resolved to the satisfaction of the Engineer before use in the field. The submitted information shall include estimated displacement characteristics for a variety of impacts (assumptions regarding both impacting vehicle weight and speed) so that appropriate temporary traffic control set-ups can be undertaken in the field.

2. The flashing arrow board shall conform to the requirements of Section 2.4, Subsection D.

J. Temporary Fence

1. The type of temporary Chain link fence shall be the Contractor's option with approval from the Owner.

2. The Contractor shall submit the type of temporary chain link fence to the Owner for approval prior to placing at the construction area. Following types are acceptable:

a. New materials or previously used salvaged chain link fencing in good condition.

b. Posts: Galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings, driving into ground, anchoring with steel base plates, or inserting in precast concrete blocks.

c. Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.

d. Gates:

i. Provide personnel and vehicle gates of the quantity and size required for functional access to site.

ii. Fabricate of same material as used for fencing.

3. Fence fabric shall be fastened to posts by means of No. 6 gauge zinc coated wire clips. No post tops are required.

PART 3 - EXECUTION

3.1. PORTABLE CHANGEABLE MESSAGE SIGN

A. The changeable message units shall be available for use one week prior to and throughout the duration of the project and be positioned in accordance with the traffic management plans approved by the Owner and/or Engineer for each phase of construction and/or at the direction of the Owner and/or Engineer. The signs shall be visible from a minimum distance of 900 feet with a viewing angle of no less than 30 degrees. The Contractor shall take appropriate measures as needed within the roadway layout to provide the required minimum sight distance. The Contractor shall be responsible for the maintenance of each device and appurtenance. If the unit is found to be defective in any way it shall be replaced immediately at the Contractor's expense.

3.2. TRAFFIC CONTROL DEVICES

A. Temporary Safety Signing

1. Signs which are damaged or are missing from their locations shall be replaced by the Contractor without additional compensation.

2. All signs shall be maintained in a satisfactory manner including the removal of dirt or road film that causes a reduction in sign retroreflectivity.

3. All signs shall be mounted in compliance with the requirements of the MUTCD.

4. All signs not consistent with the use of the roadway shall be removed, completely covered, or turned away from traffic each day. In no case shall signs or their portable supports be left in the traveled way when the traffic management set-up has been removed.

5. Rollup signs shall only be used for single work shift setups.

B. Temporary Pavement Markings

1. The Contractor shall install all necessary temporary pavement markings prior to opening the roadway to traffic following the completion of each day's operations. The Contractor shall make all necessary arrangements for this work beforehand so that it may be properly coordinated with construction operations. Temporary pavement markers shall be installed in accordance with the requirements of the MUTCD.

C. Arrow Board

1. The arrow board shall be deployed as shown on the approved Traffic Management Plan or as directed. The unit shall be properly maintained throughout its use on the project.

D. Reflectorized Drums

1. Reflectorized drums are to be used as channeling devices in roadway work zones. The first five drums used for any taper or as designated on the Traffic Management Plan shall be equipped with flashing lights.

E. Temporary Barrier

1. The Temporary Barrier shall be installed where needed to provide protection of work zone and as directed by the Owner and/or Engineer in accordance with these provisions.

2. Each run of temporary barrier units shall be fastened together to form a continuous chain.

3. Temporary impact attenuators with delineation shall be installed at ends of barriers within 30 feet of the travelled way. The Contractor shall not leave a barrier leading-end unprotected.

4. Delineators shall be installed in conformance with manufacturer's

recommendations on the barriers at their termini; at 20-foot intervals on tangent sections; and 10 foot intervals on curved sections depending on radius as determined by the Owner and/or Engineer.

5. Delineators mounted on top of barriers separating opposing traffic shall have two sided amber reflectors delineating the left edge. Side mounted delineators shall have amber delineating the left edge, white delineating the right edge and have red as the back color. If mounted on the sides they shall be 6 inches below the top and on the side of traffic. Delineators shall be mounted at angles that provide maximum reflectorization.

6. Temporary Barriers shall be removed from existing locations, transported, and reset as needed in accordance with above requirements, as directed by the Owner and/or Engineer.

F. Temporary Restrained Barrier

1. The Contractor shall ensure that where the restrained barrier is to be pinned to the roadway, the pin holes are filled with a sand mortar mix upon removal of the barrier. If the barrier is to be restrained by setting it into the roadway in a planned slot, the roadway surface shall be restored by appropriate full depth HMA or Cement Concrete roadway reconstruction.

2. The Contractor shall ensure that the restrained barrier is required or directed by the Owner and/or Engineer to be bolted to the bridge deck, the deck reinforcement will not be damaged during the installation of the proposed barrier anchor bolts. Any damage to the deck reinforcement, which occurs during the course of the Contractor's operations, shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

3. Impact or percussion drills are allowed if no distress occurs to the existing concrete. Their use is subject to the approval of the Owner and/or Engineer.

4. If core drilling, the holes may be cored using either a carbide or diamond bit. The diameter of the cored holes shall be in accordance with the recommendations of the resin manufacturer. If a diamond bit is used to core the holes in the proposed deck, a sandblast, high-pressure water blast, or other mechanical means must be used to properly roughen the inner surface of the holes. The type of abrasive surface roughening used shall be approved by the Owner and/or Engineer.

5. On the concrete deck all holes shall be blown clear of any debris prior to placement of resin. The Contractor shall have the approval of the

Engineer signifying that the holes are clean prior to placing the resin adhesive. The Contractor shall strictly follow the recommendations of the manufacturer for mixing and placing the adhesive material prior to the placement of the bolts. The Contractor shall not place adhesive material when the existing concrete temperature is below 40°F. Any excessive resin adhesive around the hole after placement of the bolt shall be struck off smooth while the resin adhesive is still workable.

6. The anchor bolt holes shall be repaired as needed by methods acceptable to the Engineer at no additional cost to Owner. Damage to the concrete-to-remain shall be repaired to a condition equal to or better than that prior to the beginning of these operations, at no additional cost to the Owner.

7. High strength bolts shall be installed through pockets formed in the barriers and bonded in holes drilled in either the existing or proposed concrete deck. The bolts shall be suitably coated to facilitate removal from the mating threads of the cured resin adhesive once the barriers are no longer needed. The process of removing the bolts shall cause no distress to the proposed deck concrete.

8. The bolt embedment length and resin adhesive shall be adequate to develop a minimum of 36 Kips of tension in the bolts. The embedment length shall not be less than 6½" in concrete and shall not extend below the bottom of the proposed deck.

9. Where the condition of the existing deck is unsuitable due to deterioration or insufficient embedment depth, bolts extending through the deck and fastened to an appropriately sized steel member which will provide the required pull strength may be used.

10. The details of the proposed bolted anchorage system and all installation and removal procedures shall be in accordance with the recommendations of the manufacturer, and shall be submitted to the Engineer for approval.

11. Field tests shall be performed to verify the effectiveness of the anchorage detail including the drilled hole diameter, embedment length, and the resin adhesive capacity. Two test bolts in both the existing concrete and the new concrete shall be installed and tested by the Contractor for pullout as required by the system manufacturer. If the desired strength is not achieved, the Contractor shall adjust the hole size, embedment length, bolt size, and/or adhesive material to meet this test requirement. Retesting as required by the Engineer shall be performed by the Contractor, at no additional cost to the Owner.

12. All testing shall be performed by the Contractor and is incidental to the work under this item. The method of applying the tension test

load to the bolts shall be in accordance with ASTM E488. The testing equipment used and the locations and details of the test bolts shall be submitted to the Engineer for approval. The Contractor shall perform this test as soon as possible in order to eliminate delays in construction due to the approval process. Bolts shall not be ordered until the embedment lengths have been approved.

13. The delineators shall be single units, with yellow or white lenses on both sides, placed 6" below the top and on the traffic side of the median barrier at 20' on center. The delineators shall be the type designed expressly for this type of attachment and may be made entirely of plastic.

14. Temporary impact attenuators with delineation shall be installed at ends of barriers within 30 feet of approaching traffic. The Contractor shall not leave a barrier leading end unprotected.

15. Temporary Barriers on Bridge shall be removed from existing locations and reset in accordance with above requirements, as directed by the Engineer.

G. Portable Breakaway Barricades Type III

1. The Contractor shall furnish, set up, move and remove Portable Breakaway Barricades Type III as required or directed by the Engineer. Portable Breakaway Barricades Type III shall be maintained in a good and serviceable condition throughout the project and shall be moved from place to place as required during construction and as directed by the Owner and/or Engineer.

H. Temporary Impact Attenuators

1. Excavation for temporary attenuator foundations and anchorage shall be made to the required depth and to a width that will permit the installation and bracing of forms where necessary. All soft and unsuitable material shall be replaced with compacted gravel borrow.

2. The temporary impact attenuator shall be installed in accordance with the manufacturers' specifications and recommendations. Copies of these specifications and recommendations shall be provided to the Owner and/or Engineer.

3. Temporary Impact Attenuators damaged by traffic shall be replaced by the Contractor within 24 hours or as directed by the Owner and/or Engineer.

4. Temporary Impact Attenuators Removed and Reset consists of removing temporary impact attenuators furnished above, relocating

and re-installing it at new locations in accordance with the specifications and recommendations of the manufacturer.

I. Truck-Mounted Attenuator

1. The truck-mounted attenuator shall be utilized as shown on the plans or as directed by the Owner and/or Engineer, at the proper orientation and height above the paved surface.

2. A damaged truck-mounted attenuator shall not be used. Any repairs to the attenuator shall be accompanied by a statement from the product manufacturer certifying the repairs that were performed. Any work that becomes delayed due to the lack of a properly functioning truck-mounted attenuator will not constitute justification for an extension of time.

J. Pavement Marking Removal

1. The existing pavement markings shall be removed to the fullest extent possible by an approved method. Pavement marking removal methods shall not cause damage to the pavement or cause drastic change in texture, which could be construed as delineation at night, and shall be approved by the Engineer. It is not permissible to paint over existing markings with black paint in lieu of removal. Approved methods include but are not limited to:

   a. High pressure air.

   b. High pressure water (cold weather use not permitted)

   c. Sand blasting,

   d. Mechanical devices such as grinders, sanders, scrapers, scarifiers and wire brushes.

2. Painting over a pavement marking line by use of asphaltic liquids or paints will not be permitted.

3. Conflicting pavement markings shall be removed before any change is made in the traffic pattern.

4. Material deposited on the pavement as a result of removing markings shall be removed as the work progresses. Accumulations of sand or other material, which might interfere with drainage or could constitute a hazard to traffic, will not be permitted.

5. Any damage to the pavement or surfacing caused by pavement marking removal shall be satisfactorily repaired by the Contractor at

no additional cost to the Owner.

6. Where the removal operation is being performed near a lane occupied by traffic, a vacuum attachment operating concurrently with the removal operation must be in use. All residue shall be removed immediately from the surface being treated.

7. Existing raised pavement markers shall be removed by a method approved by the Engineer. Any damage to the pavement or surfacing caused by pavement marking removal shall be repaired at no additional cost by methods acceptable to the Engineer. Voids in the pavement shall be filled with like materials with adhesive bonding to the substrate.

8. Following completion of construction, permanent pavement markings shall be installed to replace pre-construction makings to comply with MUTCD.

K. Temporary Fence

1. The Contractor shall install and maintain temporary construction fences at the location as directed by the Owner and/or Engineer.

2. 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.

3. Installation of temporary fencing shall not deter or hinder access to existing or proposed fire hydrants. Maintain 3 feet diameter clear space around fire hydrants. Where fire hydrant is blocked by fencing, provide access gate markings with black paint in lieu of removal.

4. The Contractor shall replace fence due to construction accidents, vandalism and/or any other manner by the Contractor at no additional cost to the Owner.

END OF SECTION 01850

DIVISION 2

SITE WORK

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SECTION 02020

EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies equipment and materials for an erosion and sediment control program and truck wheel wash station installation during the construction phase of the project. The erosion and sediment control provisions detailed on the Drawings and specified herein are the minimum requirements for 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.

1.2 RELATED SECTIONS

A. Examine Contract Documents and Drawing Details for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 01110 – Environmental Protection Procedures

3. Section 02140 – Dewatering and Drainage

4. Section 02200 – Earthwork

1.3 SUBMITTALS

A. Proposed methods, materials to be employed, and schedule for effecting erosion and siltation control and preventing erosion damage shall be submitted for approval. Submittals shall include:

1. List of proposed materials including manufacturer's product data.

2. Erosion Controls shall be installed prior to construction. Erosion Controls damaged during construction shall be replaced immediately and installed per the Details. Schedule of any additional erosion control program indicating specific dates for implementing programs in each major area of work, including Erosion Control installation, truck wheel wash station installation, and dewatering sedimentation basin(s) shall be submitted prior to installation.

B. Samples

The following samples shall be submitted:

Sample	Size
Filter Fabric	12 X 12 in.

(Woven and Non-woven)

1.4 REFERENCES

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

1. Massachusetts Department of Public Works, and The Commonwealth of Massachusetts Department of Public Works; Construction Standards.

2. Massachusetts Department of Environmental Protection.

1.5 EROSION CONTROL PRINCIPLES

A. Erosion Control Principles

The following erosion control principles shall apply to the land grading and construction phases:

1. Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion.

2. Whenever feasible, natural vegetation shall be retained and protected.

3. Extent of area which is exposed and free of vegetation and duration of its exposure shall be kept within practical limits.

4. Temporary seeding, mulching, or other suitable stabilization measures shall be used to protect exposed critical areas during prolonged construction or other land disturbance. Prolonged exposure of unstabilized soil shall not exceed 60 days.

5. Drainage provisions shall accommodate increased runoff resulting from modifications of soil and surface conditions during and after development or disturbance. Such provisions shall be in addition to existing requirements.

6. Sediment shall be retained on-site.

7. Erosion control devices and truck wheel wash station shall be installed prior to start of clearing and grubbing operations and excavation work.

B. Erosion Protection

1. Cut and fill slopes and stockpiled materials shall be protected to prevent erosion. Slopes shall be protected with permanent erosion protection when erosion exposure period is expected to be greater than or equal to two months, and temporary erosion protection when erosion exposure period is expected to be less than two months.

2. Permanent erosion protection shall be accomplished by seeding with grass and covering with an erosion protection material, as appropriate for prevailing conditions.

3. Temporary erosion protection shall be accomplished by covering with an erosion protection materials, as appropriate for prevailing conditions.

4. Except where specified slope is indicated on Drawings, fill slopes shall be limited to a grade of 4:1 (horizontal: vertical) cut slopes shall be limited to a grade of 4:1.

PART 2 - PRODUCTS

2.1 FILTER SOCK

A. Filter sock for construction of erosion control devices shall be blown or placed media (mulch or compost) in twelve-inch diameter biodegradable filter sock. The use of hay bales or hay-filled wattles is not permitted. If wattles are used, they must be filled with compost, bark, or similar materials, along with silt fence.

B. Wooden stakes (2-in. by 2-in. by 36-in.) shall be placed 10 foot on center, driven a minimum of 12 inches into the ground.

2.2 SILT SACKS

A. Silt sacks or approved equal shall be placed in all catch basins or drop inlets as indicated on the Drawings. The silt sacks shall be in accordance with the construction details on the Drawings.

2.3 SILT BAGS

A. Silt bags shall be utilized for trench dewatering activities. The silt bags shall be in accordance with the construction details on the Drawings.

2.4 TEMPORARY SEED COVER

A. If required, seed mixture for temporary cover by hydroseeding application shall conform to the following:

Quantity per 1000 sq. ft. Coverage	Material
27-1/2 lb.	Wood Fiber Mulch
4 lb.	Seed
½ lb.	Annual Ryegrass
22 lb.	10-6-4 Fertilizer
69 gal.	Water

B. Hydroseeding Equipment

1. Hydroseeding equipment may be either portable or truck mounted, with dual agitation, a minimum working volume of 1000 gallons and a minimum spray range of 80 ft.

2. Hydroseeding equipment must be capable of uniformly applying the slurry mix including wood fiber mulch if required, at the specified rate, and at the required locations.

3. Hydromulching equipment, either trailer or truck mounted, must be capable of uniformly applying straw or hay mulch at a minimum mulching rate of 8 tons per hour, at a distance of not less than 80 ft.

PART 3 - EXECUTION

3.1 HYDROSEEDING

A. If required for long-term disturbance greater than 60 days, seed for temporary cover shall be spread by the hydroseeding method, utilizing power equipment commonly used for that purpose. Seed, fertilizer, mulch and water shall be mixed and applied to achieve application quantities specified. Material shall be applied in 2 equal applications, with the equipment during the second pass moving perpendicular to direction employed during the first pass. Hydroseeding shall not be done when it is raining or snowing, or when wind velocity exceeds 5 mph.

B. If the results of hydroseeding application are unsatisfactory, the mixture and/or application rate and methods shall be modified to achieve the required results.

C. After the grass has appeared, all areas and parts of areas which fail to show a uniform stand of grass, for any reason whatsoever, shall be reseeded and such areas and parts of areas seeded repeatedly until all areas are covered with a satisfactory growth of grass.

3.2 MAINTENANCE AND REMOVAL OF EROSION CONTROL DEVICES

A. Wetland area, water courses, and drainage swales adjacent to construction activities shall be monitored continuously for evidence of silt intrusion and other adverse environmental impacts, which shall be corrected immediately upon discovery.

B. Culverts and drainage ditches shall be kept clean and clear of obstructions during construction period.

C. Erosion Control Devices

1. Sediment behind the erosion control device shall be checked twice each month and after heavy rain. Silt shall be removed if greater than 6 in. deep.

2. Condition of erosion control device shall be checked twice each month 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. Straw bales shall be inspected frequently and maintained or replaced as required to maintain both their effectiveness and essentially their original condition. Underside of bales shall be kept in close contact with the earth below at all times, as required to prevent water from washing beneath bales.

4. Sediment deposits shall be properly disposed of, in a location and manner which will not cause sediment nuisance elsewhere.

D. Removal of Erosion Control Devices

1. Erosion control devices shall be maintained until all disturbed earth has been paved or vegetated, at which time they shall be removed in their entirety. After removal, areas disturbed by these devices shall be regraded and seeded.

2. Erosion protection material shall be kept securely anchored until acceptance of the entire Project.

END OF SECTION 02020

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SECTION 02101

SITE INVESTIGATION

PART 1 – GENERAL

1.1 SITE CONDITIONS

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 02101

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SECTION 02140

DEWATERING AND DRAINAGE

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish, install, operate, monitor, maintain, and remove temporary dewatering and drainage systems as necessary to lower and maintain groundwater levels below subgrades of excavations and prevent surface water runoff from entering or accumulating in excavations, to permit construction in the dry.

B. Collect and properly dispose of all discharge water from dewatering and drainage systems in accordance with local requirements and permits.

C. Repair any damage caused by dewatering and drainage system operations.

D. Remove temporary dewatering and drainage systems when no longer needed, and restore all disturbed areas.

1.2 RELATED WORK

A. Earthwork is included in Section 02200.

B. Environmental Protection Measures is included in Section 01110.

1.3 SUBMITTALS

A. Submit the proposed temporary dewatering and drainage system designs. Contractor shall remain responsible for adequacy and safety of construction means, methods, and techniques.

1.4 DEFINITIONS

A. Where the phrase "in-the-dry" is used in these specifications, it shall be defined as soil conditions that are no more than two percentage points above the optimum moisture content for that soil.

1.5 QUALITY ASSURANCE

A. Provide in accordance with Section 01400 and as specified.

B. Employ the services of a dewatering specialist or firm having the following qualifications:

1. Have completed at least five (5) successful dewatering projects of equal size and complexity and with equal systems within the last five (5) years.

2. Retain the services of a Registered Professional Engineer (in the state where the project is located) having a minimum of five (5) years experience in the design of well points, deep wells, recharge systems, or equal systems.

3. Retain the services of a field representative having a minimum of 5 years experience in installation of well points, deep wells, recharge systems, or equal systems.

B. If subgrade soils are disturbed or become unstable due to dewatering operation or an inadequate dewatering system, notify the Engineer, stabilize the subgrade, and modify system to perform as specified at no additional cost to the Owner.

C. Notify the Engineer immediately if any settlement or movement is detected on structures. If the settlement or movement is deemed by the Engineer to be related to the dewatering, take actions to protect the adjacent structures and submit a modified dewatering plan to the Engineer within 24 hours. Implement the modified plan and repair any damage incurred to the adjacent structures at no additional cost to the Owner.

D. If oil and/or other hazardous materials are encountered after dewatering begins, immediately notify the Engineer.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Piping, pumping equipment and all other materials required to dewater excavations shall be suitable for the intended purpose. Standby pumping units shall be maintained at the site to be used in case of failure of the normal pumping units. Do not excavate until the dewatering system is operational

B. Provide and store auxiliary dewatering equipment, consisting of pumps and hoses on the site in the event of breakdown, a minimum of one (1) working auxiliary pump is required, and an additional one (1) pump for every five (5) used.

C. If water is to be stored onsite, provide holding tanks of sufficient volume and quantity to hold all construction water.

D. Provide and maintain erosion/sedimentation control devices as indicated or specified and in accordance with the dewatering plan.

E. Provide temporary pipes, hoses, flumes, or channels for the transport of discharge water to the discharge location.

F. Provide cement grout having a water cement ratio of 1 to 1 by volume.

PART 3 – EXECUTION

3.1 GENERAL

A. Surface water and groundwater shall be controlled such that excavation to final grade is made in-the-dry, the bearing soils are maintained undisturbed and softening or instability of, or disturbance to, the subgrade due to the presence or seepage of water does not occur.

B. All work shall be protected from flotation.

C. The impact of anticipated subsurface soil/water conditions shall be factored into the selection of methods of excavation and proposed dewatering and drainage systems. Where groundwater levels are above the proposed bottoms of excavations, it is expected that some type of pumped dewatering system will be required for predrainage of the soils prior to excavation to final grade and for maintaining the lowered groundwater level until construction has been completed to such an extent that the foundation, structure, pipe, conduit, or fill will not be floated or otherwise damaged. It is further expected that the type of system, spacing of dewatering units, and other details of the work will vary depending on soil/water conditions at a particular location.

3.2 SURFACE WATER CONTROL

A. Surface water control measures shall be constructed to prevent flow of surface waters into excavations. Such measures may include dikes, ditches, and sumps.

3.3 EXCAVATION DEWATERING

A. Provide and maintain adequate equipment and facilities to remove promptly and dispose of properly all water entering excavations. Excavations shall be kept in-the-dry, so as to maintain an undisturbed subgrade condition throughout construction below grade, including backfill and fill placement.

B. Water entering excavations from precipitation or surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sump, and pumped from the excavation to maintain in-the-dry conditions.

C. Pipe and conduit shall not be laid in water or allowed to be submerged prior to backfilling. Pipe and conduit which becomes submerged shall be removed and the excavation dewatered and restored to proper conditions prior to reinstalling the pipe and conduit.

D. Excavations for foundations and structures shall be maintained in-the-dry for a minimum of four days after concrete placement. In no event shall water be allowed

to enter an excavation and rise to cause unbalanced pressure on foundations and structures until the concrete or mortar has set at least 24 hours.

E. Dewatering and drainage operations shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade at the bottom of the excavation. If the subgrade becomes disturbed for any reason, the unsuitable subgrade material shall be removed and replaced with concrete, compacted granular fill, or other approved material to restore the bearing capacity of the subgrade to its natural undisturbed condition.

F. Dewatering and drainage operations shall be conducted in a manner which does not cause loss of ground or disturbance to the pipe bedding or soil which supports overlying or adjacent structures.

3.4 DISPOSAL OF DRAINAGE

A. All water discharged from temporary dewatering and drainage systems shall be disposed of in accordance with approved sedimentation and control plans and methods. Existing or new sanitary sewer systems or private on-site septic systems shall not be used to dispose of drainage.

END OF SECTION 02140

SECTION 02200

EARTHWORK

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes excavations of normal depth in earth for trenches and structures; backfilling such excavations to the extent required; filling; rough grading; miscellaneous earth excavation; temporary excavation support; the removal, hauling and stockpiling of suitable excavated material for subsequent use in the work; all rehandling, hauling and placing of stockpiled materials for use in refilling, filling, backfilling, grading and such other operations; the removal and satisfactory disposal off the site of unsuitable material; compaction; and appurtenant work, complete, in accordance with the Drawings and Specifications, and as directed.

B. Related Sections includes the following:

1. Dewatering and Drainage – Section 02140

2. Rock Excavation – Section 02212

3. Pavement Repair and Resurfacing – Section 02576

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Backfill Materials: If requested by the Engineer, the contractor shall pay for and submit a grain size analysis and curve performed in accordance with ASTM D422 for each proposed source of backfill for review by the Engineer. The grain size analysis shall indicate that the backfill material conforms to the gradation requirements specified.

C. If requested by the Engineer, submit a grain size analysis and a constant head permeability result in accordance with ASTM D422 and ASTM D2434 respectively for each proposed source of drainage sand for review by the Engineer.

D. If requested by the Engineer, submit a controlled density fill (CDF) mix design showing the proportions and gradations of all materials.

E. If requested by the Engineer, submit a moisture-density curve indicating the

maximum dry-density and optimum moisture content as determined by ASTM D1557 for each proposed source of backfill for review by the Engineer.

F. Submit the qualifications of the independent geotechnical testing laboratory performing soil testing and inspection services during earthwork operations. The geotechnical testing laboratory must demonstrate to the Engineer's satisfaction, based on evaluation of laboratory submitted criteria conforming to ASTM D3740, that it has the experience and capability to conduct required field and laboratory geotechnical testing. In addition, the laboratory shall be supervised by a Registered Professional Engineer in the State of Massachusetts.

G. Submit an excavation, backfilling, and filling plan at least one week prior to start of any earth moving activities. The review will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy and safety of the means, methods and sequencing of construction. The plan shall include, but not be limited to the following items:

1. Detailed sequence of work.

2. General description of construction methods.

3. Numbers, types, and sizes of equipment proposed to perform excavation and compaction.

4. Details of dust control measures.

5. Proposed locations of stockpiled excavation and/or backfill materials.

6. Proposed surplus excavated material off-site disposal areas and required permits.

1.3 EXCAVATION CLASSIFICATIONS

A. Earth Excavation or "Excavation" consists of removal of materials encountered to the subgrade elevations indicated and subsequent reuse or disposal of the materials removed. All excavation is classified as earth excavation unless it otherwise meets the classifications provided below for exploratory excavation, unauthorized excavation, additional excavation, or rock excavation.

B. Exploratory Excavation, also referred to as test pits, shall consist of the removal of materials for the purpose of locating underground utilities or structures as an aid in establishing the precise location of new work. Exploratory excavation shall be performed as shown on the plans and as directed by the Engineer. Exploratory excavation shall be paid for under the unit cost pay item.

Exploratory excavation not directed or approved by the Engineer shall be at the Contractor's expense.

C. Unauthorized Excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at Contractor's expense.

D. Additional Excavation:

1. When excavation has reached required subgrade elevations, notify the Engineer who will review subgrade conditions.

2. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by the Engineer.

3. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work or as provided for under the unit rates for this classification.

E. Rock Excavation:

1. Determination of rock excavation classification will be made by the Engineer as specified in Section 02212 – Rock Excavation.

1.4 EXCAVATION

A. The Contractor shall perform all excavations of every description and of whatever substances encountered, in a manner as required to allow for placing of temporary earth support, forms, installation of pipe and other work, and to permit access to the Engineer for the purpose of observing the work. Excavations shall be to such widths as will give suitable space for the required work. Bottoms of trenches and excavations shall be protected from frost and shall be firm, dry and in an acceptable condition to receive the work; work shall not be placed on frozen surfaces nor shall work be placed on wet or unstable surfaces.

B. All excavations made in open cut will be controlled by the conditions existing at the various locations and shall always be confined to the limits as designated by the Engineer. In no case shall earth be excavated or disturbed by machinery so near to the finished subgrade for structures and pipelines as to result in the disturbance of the earth below the subgrade. The final excavation to subgrade should be accomplished with a smooth faced bucket or by hand if directed by the Engineer.

C. The Contractor shall satisfy all dewatering requirements specified in Section

02140 – Dewatering and Drainage, before performing trench excavations.

1.5 TEMPORARY EARTH SUPPORT

A. The Contractor shall furnish, place and maintain such sheeting, shoring, and bracing at locations necessary to support the sides of excavations and to prevent danger to persons or damage to pavements, facilities, utilities, or structures, and to prevent injurious caving or erosion or the loss of ground, and to maintain pedestrian and vehicular traffic as directed and required.

B. In all sheeting, shoring and bracing operations, care shall be taken to prevent injury to persons or damage to structures, facilities, utilities and services. Any injuries to persons shall be the responsibility of the Contractor; and any damage to the work occurring as a result of settlement, water or earth pressure, or other causes due to inadequate bracing or other construction operations of the Contractor shall be satisfactorily repaired or made good by the Contractor, at no additional expense to the Owner.

C. Where sheeting is to be used, it shall be driven ahead of excavation operations to the extent practicable so as to avoid the loss of material from behind the sheeting; where voids occur outside of the sheeting, they shall be filled immediately with selected fill, thoroughly compacted.

D. The Contractor shall leave in place all sheeting and bracing at the locations and within the limits ordered by the Engineer in writing. The Contractor shall cut off the sheeting at elevations to be determined by the Engineer.

E. The Contractor shall comply with all federal, state, and local safety regulations, and requirements.

F. Conform to the requirements of the OSHA Standards and Interpretations: “Part 1926 Subpart P-Excavation, Trenching, and Shoring”.

PART 2 – PRODUCTS

2.1 BACKFILL MATERIALS

A. Gravel borrow. Gravel borrow (structural fill, common fill, or backfill) shall consist of inert material that is hard, durable stone and coarse sand free from frost, frozen lumps, loam and clay, surface coatings, and deleterious materials.

Graduation requirements for gravel shall be determined by AASHTO-T11 and T27 and shall conform to the following:

Sieve Designation	Percent Passing

1/2 in.	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-10

Maximum size of stone in gravel shall be 6 inches largest dimension

B. Processed gravel. Processed gravel shall be obtained from approved natural deposits and unprocessed except for the removal of deleterious materials and stones larger than the maximum size permitted. Processed gravel shall conform to the Massachusetts Department of Transportation Standard Specifications, Section M1.01.1 "Processed Gravel for Sub-Base".

Processed gravel shall be unfrozen and substantially free from vegetation, roots, loam and other organic matter, clay, snow, frozen particles and other fine or harmful substances.

Processed Gravel: Inorganic granular material meeting the following gradation:

Sieve Designation	Percentage Passing
3 in.	100
1-1/2 in.	70 – 100
3/4 in.	50 – 85
No. 4	30 – 60
No. 200	0 – 10

C. Crushed stone. Crushed stone shall consist of sound, durable stone, free of any foreign material, angular in shape, free from structural defects and comparatively free of chemical decay. The stone shall be maximum size of 1-1/2-in and a minimum size of 1/2-in. Crushed stone shall be used as ordered by the Engineer.

D. Topsoil: Friable loam, typical of fertile local topsoil; free from pure clay, weeds, noxious weed seeds, sod, clods and stones larger than 1 inch, toxic substances, litter, or other deleterious material; having a mildly alkaline to medium acid pH between 6.0 and 7.5. Soluble salts shall not exceed 4 milli-mhos per centimeter.

Soil Texture: 20 to 40% fines (silt and clay fraction passing the 200 sieve) and 60 to 80% Sand and gravel. The maximum particle size shall be 1-inch.

Organic Content: 5 to 10%

Additives: As required by soil analysis of Topsoil for, lawn areas.

E. Controlled Density Fill (CDF) or "Flowable Fill": Controlled density fill shall consist of a flowable, self-consolidating, rigid setting, low density mixture

meeting performance standards as specified in Massachusetts Highway Department 1995 Standard Specifications for Highway and Bridges, Type 2E. CDF is to be batched at a ready mix plant and is to be used at a high or very high slump of approximately 10 to 12 inches. It shall be flowable, require no vibration and after it has been placed can be excavatable by hand tool and/or small machines. The ingredients shall comply with the following:

Portland Cement – AASHTO M 85
Fly Ash – AASHTO M 295 Class F
Sand – M4.02.02 (Massachusetts Highway Specification)

2.2 DUST CONTROL

A. Calcium chloride shall conform to AASHTO M144, Type I or Type II.

PART 3 – EXECUTION

3.1 EXCAVATION

A. Cut pavement with a saw or pneumatic tools to prevent damage to remaining pavement without extra compensation. Where pavement is removed in large pieces, dispose of pieces before proceeding with excavation.

B. Do not remove excavation materials from the site of the work or dispose of except as directed or permitted by the Engineer.

C. Provide suitable and safe bridges and other crossings where required for accommodation of travel, and to provide access to private property during construction, and remove said structures thereafter.

D. Trenches shall be excavated to sufficient depths and to sufficient widths for installing new pipe/components where required, placing and removing of decking, sheeting and bracing, and for pumping and drainage facilities. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer. Trench width and depth shall be a practical minimum, as needed for proper execution for the work, and shall be performed in accordance with the Typical Trench Detail as shown on the Drawings.

E. While excavating and backfilling is in progress, traffic shall be maintained, and all utilities and other property protected as provided in the General Conditions and General Requirements.

F. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. The trench may be excavated by machinery to, or just below the designated subgrade, provided that material remaining in the bottom of the trench is no more than slightly disturbed. Subgrade soils which

become soft, loose, "quick", or otherwise unsatisfactory as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by gravel borrow as required by the Engineer at the Contractor's expense.

G. Clay and organic silt soils are particularly susceptible to disturbance due to construction operations. When excavation is to end in such soils, the Contractor shall use a smooth-edge bucket to excavate the last one foot of depth.

H. Where pipe is to be laid in crushed stone, the trench may be excavated by machinery to the normal depth of the pipe plus the depth of the stone, provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

I. Where pipe is to be laid directly on the trench bottom, final excavation at the bottom of the trench shall be performed manually, providing a flat-bottom true to grade upon undisturbed material. Bell holes shall be made as required.

J. Excavate trenches to depths so as to permit pipe to be laid at elevations, slopes, or depths of cover indicated on drawings, and at uniform slopes between indicated elevations.

K. Make pipe trenches as narrow as practicable and do not widen by scraping or loosening materials from the sides. Make every effort to maintain sides of trenches firm and undisturbed until backfilling has been placed and compacted.

L. Excavate trenches with approximately vertical sides for entire depth of trench.

3.2 STOCKPILING OF SURPLUS EXCAVATED MATERIALS

A. The Contractor shall strip and stockpile excavated trench materials. Any bushes that are removed shall be protected and replanted in the same location. Removed curbing shall be stockpiled in a safe manner. Where grassed areas are disturbed by stockpiled materials, the Contractor shall rake out the area and loam and re-seed at his expense.

B. Stockpiling of materials shall be included in the pay items for excavating and no allowances shall be made for any stripping and stockpiling requirements.

C. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided by the Contractor. When required, it shall be re-handled and used in backfilling the trench.

3.3 PROTECTION OF EXISTING STRUCTURES

A. Carefully support and protect from damage, existing pipes, poles, wires, fences, curbings, property line markers, and other structures, which the Engineer determines must be preserved in place without being temporarily or permanently relocated. Should such items be damaged, restore without compensation therefore, to at least as good condition as that in which they were found immediately before the work was begun. Contractor shall hand dig around existing utilities.

B. Curbing, fencing, sign posts, utility poles, mailboxes, etc. in the vicinity of the Contractor's operations shall be adequately protected, and if necessary removed and restored after backfilling. All items which are damaged during construction shall be replaced with material fully equal to that existing prior to construction.

C. Enclose uncut tree trunks adjacent to work in wooden boxes of such height as may be necessary for protection from injury from piled material, equipment, operations, or otherwise due to work. Operate excavating machinery and cranes of suitable type with care to prevent injury to trees not to be cut and particularly to overhanging branches and limbs.

D. Cut all branches, limbs, and roots smoothly and neatly without splitting or crushing. Neatly trim, cut the injured portions and cover with an application of grafting wax or tree healing paint as directed.

E. Protect cultivated hedges, shrubs, and plants which might be injured by the Contractor's operations by suitable means or dig up and temporarily replant and maintain. After construction operations have been substantially completed, replant in original positions and care for until growth is reestablished. If cultivated hedges, shrubs, and plants are injured to such a degree as to effect their growth or diminish in their beauty or usefulness, replace by items of equal kind and quality existing at the start of the work.

F. Do not use or operate tractors, bulldozers, or other power-operated equipment on paved surfaces when their treads or wheels of which are so shaped as to cut or otherwise damage such surfaces.

G. Restore surfaces damaged by the Contractor's operations to a condition at least equal to that in which they were found immediately before work commenced. Use suitable materials and methods for such restoration.

3.4 RELOCATION AND REPLACEMENT OF EXISTING STRUCTURES

A. Whenever certain existing structures, as described below, are encountered, and the Engineer so directs, change the location, remove and later restore, or replace such structures, or assist the Owner in doing so. Such work to be paid for under applicable items of work, otherwise as Extra Work.

B. In removing existing pipes or other structures, include for payment only those new materials which are necessary to replace those unavoidably damaged as determined by the Engineer.

C. The preceding two paragraphs apply to pipes, wires, and other structures which meet the following: (a) are not indicated on the drawings or otherwise provided for, (b) encroach upon or are encountered near and substantially parallel to the edge of the excavation, and (c) in the opinion of the Engineer, will impede progress to such an extent that satisfactory construction cannot proceed until they have been changed in location, removed (to be later restored), or replaced.

3.5 EXCAVATION SUPPORT SYSTEM

A. Furnish, put in place and maintain sheeting and bracing required by Federal, State or local safety requirements to support the sides of the excavation and prevent loss of ground which could endanger personnel, damage or delay the work or endanger adjacent structures. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he/she may order additional supports placed at the expense of the Contractor. Compliance with such order shall not relieve the Contractor from his/her responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

B. When moveable trench bracing such as trench boxes, manhole boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the screened gravel backfill.

C. When installing pipe; trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, screened gravel shall be placed to fill any voids created and the screened gravel and backfill shall be recompacted to provide uniform side support for the pipe.

D. The Contractor will be permitted to use steel sheeting in lieu of wood sheeting for the entire job wherever the use of sheeting is necessary. The cost for use of sheeting will be included in the bid items for pipe and shall include full compensation for driving, bracing and later removal of sheeting.

E. All sheeting and bracing shall be carefully removed in such manner as not to endanger the construction of other structures, utilities, or property, whether public or private. All voids left after withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as directed.

F. The Contractor shall receive no payment, for sheeting, bracing, etc., during the progress of the work. The Contractor shall receive no payment for sheeting which has actually been left in the trench for the convenience of the Contractor.

G. Sheeting driven below mid-diameter of any pipe shall remain in place from the driven elevation to at least 1-ft above the top of the pipe.

3.6 BACKFILLING

A. As soon as practicable after the pipe has been laid and jointed and inspected by the Engineer, backfilling shall begin and thereafter be prosecuted expeditiously. Select backfill shall be placed by hand shovel in 6-inch thick lifts up to the springline of the pipe. This area of backfill is considered the zone around the pipe and shall be thoroughly compacted before the remainder of the trench is backfilled.

B. Where the pipes are laid in streets, the remainder of the trench up to a depth of 12-inches below the bottom of the specified permanent paving shall be backfilled with gravel borrow material in layers not to exceed 6-inches and thoroughly compacted. The sub-base layer shall be 12-inches of processed gravel thoroughly compacted.

C. To prevent longitudinal movement of the pipe, dumping backfill material into the trench and then spreading will not be permitted until selected material or screened gravel has been placed and compacted to a level 12-inches over the pipe.

D. Unfavorable Conditions:

1. In no case shall fill be placed over material that is frozen. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.

2. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of the day's operations. Prior to terminating work for the day, the final layer of compacted fill shall be rolled with a smooth wheeled roller to eliminate ridges of soil left by compaction equipment.

E. An impervious dam or bulkhead cutoff of clay or other impervious material shall be constructed in the trench as directed, to interrupt the unnatural flow of groundwater after construction is completed. The dam shall be effectively keyed into the trench bottom and sidewalls. Provide at least one clay or other impervious material dam in the pipe bedding between each manhole where directed or every 300 feet, whichever is less.

F. Backfilling and filling operation shall be suspended in areas where tests are being made until tests are completed and the testing laboratory has advised the Engineer that adequate densities are obtained.

G. Subject to the approval of the Engineer, fragments of ledge and boulders smaller than 6-in may be used in trench backfill providing that the quantity in the opinion of the Engineer, is not excessive. Rock fragments shall not be placed until the pipe has at least 2-ft of earth cover. Small stones and rocks shall be placed in thin layers alternating with earth to insure that all voids are completely filled. Fill shall not be dropped into the trench in a manner to endanger the pipe.

H. Bituminous paving shall not be placed in backfilling unless specifically permitted, in which case it shall be broken up as directed. Frozen material shall not be used under any circumstances.

I. All road surfaces shall be broomed and hose-cleaned immediately after backfilling. Dust control measures shall be employed at all times.

J. Exploratory excavation shall be backfilled as soon as the desired information has been obtained. The backfilled surface shall be maintained in a satisfactory condition for travel until resurfaced as specified.

3.7 COMPACTION

A. Compaction Requirements: The degree of compaction is expressed as a percentage of the maximum dry density at optimum moisture content as determined by ASTM Test D1557, Method C. The compaction requirements are as follows:

Area	ASTM Density Degree of Compaction
Pavement sub-base	95%
General fill below pavement sub-base	95%

B. Moisture Control:

1. Fill that is too wet for proper compaction shall be dried to a proper moisture content to allow compaction to the required density. If fill cannot be dried within 24 hours of placement, it shall be removed and replaced with drier fill.

2. Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.

C. Compaction Control:

1. In-place density tests shall be made in accordance with ASTM D1556, D2922 or D2167 as the work progresses, to determine the degree of compaction being attained by the Contractor. Any corrective work required as a result of such tests, such as additional compaction, or a decrease in the thickness of layers, shall be performed by the Contractor at no additional expense to the Owner. In-place density tests will be made by a geotechnical engineer selected by the Engineer or the Contractor's independent testing laboratory at the Contractor's expense.

2. The Engineer's duties do not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Engineer nor any observation and testing performed by him shall excuse the Contractor from defects discovered in his work at that time or subsequent to the testing.

D. Material Testing Frequency: The following testing frequencies are minimum required for all structural and non-structural fill, grading and embankment.

1. Field In-Place Density and Moisture Content - Screened gravel and crushed stone shall be compacted as specified and indicated. For other backfill and fill materials, minimum test frequency shall be as follows, and no less than one test per lift:

   a. Trenches under structures foundation preparation or roadways sub-base: Every 100 lin. ft. per lift.

   b. Trenches in areas without structures or roadways: Every 250 lin. ft. per alternate lift.

   c. Paved Roadways: Every 100 lin. ft. per lift.

   d. Paved Areas: 2,000 sq. ft. per lift.

   e. Under Structure: 1,000 sq. ft. per lift.

   f. Around Structures: 1,500 sq. ft. per lift.

   g. Embankment Fills: 5,000 sq. ft. per lift.

2. Moisture Density - One per source, except for screened gravel and crushed stone. Repeat the moisture density test for every 1,000 cubic yard of material use, and whenever visual inspection indicates a change in material gradation as determined by the Engineer.

3. Gradation Analysis - A minimum of one per source and for each moisture density test and whenever visual inspection indicates a change in material gradation.

4. Liquid Limit, Plastic Limit and Plasticity Index - Minimum of one test per 500 cubic yard [382 cubic meter] of soil for use as fill material and whenever classification of material is in doubt as determined by the Engineer.

F. Compaction Methodology:

1. Each layer of backfill material shall be thoroughly compacted by rolling, tamping, or vibrating with mechanical compacting equipment or hand tamping. If rolling is employed, it shall be by use of a suitable roller or tractor, being careful to compact the fill throughout the full width of the trench.

2. Backfilling operations shall be such that material is compacted in 6 inch lifts, including the trench around the barrel of the pipe. Compaction of each lift up to a minimum of 12-inches above the pipe shall be done by use of power-driven tampers weighing at least 20 pounds or by vibratory compactors. Care shall be taken as to not place excessive pressure on the new pipe.

3. Vibratory mechanical compaction is the preferred method for compaction. Should jetting be proposed by the Contractor, its viability to achieve the required degree of compaction shall be proven on a test section of trench, prior to allowing its use on a widespread basis. Compaction testing shall be used to determine the effectiveness of the jetting operation. Jetting shall be accomplished using a rigid pipe, long enough to reach deep into the trench. Large volumes of water under high pressure equivalent to that available from a fire hydrant, are necessary for jetting. The Contractor is made aware that municipal water will not be available due to limited supply. The Contractor shall provide water for jetting operations at his own expense. Jetting locations shall be frequent enough to achieve required compaction.

4. Where other methods are not practicable, compaction shall be by use of hand or pneumatic ramming with tools weighing at least 20 lbs. The material being spread and compacted in layers not over 6-in thick. If necessary, sprinkling shall be employed in conjunction with rolling or ramming.

5. In backfilling trenches, each layer of backfill material shall be moistened and compacted to a density at least equal to that of the surrounding undisturbed earth, and in such a manner as to permit the rolling and compaction of the filled trench or excavation with the adjoining earth to

provide the required bearing value, so that paving of the excavated and disturbed areas, where required, can proceed immediately after backfilling is completed.

3.8 FINE GRADING

A. Before surface or sub-base is spread, the subgrade shall be shaped to a true surface conforming to the Drawings. All depressions and high spots shall be filled with suitable material or removed and such areas again compacted until the surface is smooth and properly compacted. A tolerance of 1/2-inch above or below the finished subgrade will be allowed provided that this 1/2-inch above or below grade is not maintained for a distance longer than 50 feet and that the required crown is maintained in the subgrade. Any portion which is not accessible to as roller shall be thoroughly compacted by other mechanical methods.

B. Construction Tolerances:

1. Construct finished surfaces to plus or minus 1 inch of the elevations indicated.

2. Grade cut and fill areas to plus or minus 0.20 foot of the grades indicated.

3. Complete embankment edges to plus or minus 6 inches of the slope lines indicated.

4. Provide the Engineer with adequate survey information to verify compliance with above tolerances.

3.9 DUST CONTROL

A. Calcium chloride shall be applied when ordered by the Engineer and only in areas which will not be adversely affected by the application.

B. Calcium chloride shall be uniformly applied at a rate of 1-1/2 pounds per square yard or at any other rate as directed by the Engineer. Application shall be by means of a mechanical spreader, or other approved method. The number and frequency of applications shall be determined by the Engineer.

3.10 PLACING TOPSOIL

A. Scarify compacted subgrade to a 2-inch depth to bond topsoil to subsoil. Place topsoil to a minimum depth of 4 inches for areas disturbed by Contractor's construction operations and as shown on the Drawings. Spread evenly and grade to elevations and slopes shown. Hand rake areas inaccessible to machine grading.

END OF SECTION 02200

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SECTION 02212

ROCK EXCAVATION

PART 1 – GENERAL

1.1 SUMMARY

A. Rock excavation may be required where boulders, monolithic concrete, reinforced concrete or stone structures measuring in excess of two cubic yards solid in volume or larger are encountered or solid ledge which, in the opinion of the Engineer, requires drilling and blasting, wedging, sledging, barring, or hydraulically fracturing for removal, is encountered.

B. The following do not constitute rock excavation: hardpan; soft or disintegrated rock; concrete which can be removed with a pick; previously blasted rock or broken stone less than the above mentioned two cubic yards; stone walls; rocks or sections of blasted ledge that may fall into or be jarred loose from the sides of the trench beyond the maximum limits of excavation approved by the Engineer.

C. The blasting shall be accomplished by an experienced technician and the Contractor or Sub-Contractor shall be conducted in accordance with 527 CMR 13.00. The Contractor will procure the proper blasting permit from the Town of Sudbury Fire Department and shall acknowledge all the contents and laws of the State Fire Marshall in handling, using, storing and transporting explosives and caps. Blasting shall be conducted with all possible care so as to avoid injury to persons and property. The rock shall be well covered with suitable mats or heavy logs chained together or other such effective appliances; sufficient warning shall be given to all persons in the vicinity of the work before blasting. Extreme care shall be taken to avoid injury to water mains and services, gas pipes, sewers, drain ducts, cables and other structures.

D. In addition to adhering to all the laws and ordinances relating to the handling and storage of explosives, the Contractor shall also conform to any further regulations deems necessary by the Fire Department Chief and the Engineer and be aware of any inspection fees as required by the fire department.

1.2 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required to excavate and dispose of rock and boulders as shown on the Drawings and as specified herein.

B. Blasting permits are the responsibility of the Contractor. All applications and fees shall be provided by the Contractor. When permits have been obtained, blasting may be used to fracture rock and boulders for excavation. If blasting is performed, provide the services of a qualified blasting technician, licensed in Massachusetts.

C. All arrangements for inspections required by the Sudbury Fire Department shall be made by the Contractor.

1.3 RELATED WORK

A. Earth excavation and backfilling are included in Section 02200.

B. Environmental Protection is included in Section 01110.

1.4 SUBMITTALS

A. Submit three copies of blasting permits required by local agencies and authorities. Original permits shall be prominently displayed on the Work site prior to initiating blasting operations. Submittals shall be for information only. Contractor shall remain responsible for means, methods, and techniques, as well as all safety considerations.

B. All blasting shall be in accordance with 527 CMR 13.00.

C. The cost for all photographs and/or pre-blast videotapes shall be included in the bid price.

D. Fees for inspection, shall be paid directly to the Sudbury Fire Department, telephone number 781-784-1522. All fees for inspection shall be included in the blasting cost.

1.5 DELIVERY, STORAGE, AND HANDLING

A. The delivery, storage, and handling of explosives shall be performed only by qualified persons licensed in Massachusetts, and shall be in full conformance with all laws, regulations, ordinances, and practices. Extreme care shall be taken to avoid injury or damage to persons or property.

1.6 DEFINITIONS

A. Typical of materials classified as rock are boulders 2.0 cu. yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits. Intermittent drilling, blasting or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by Engineer. If the area to be excavated is preblasted prior to the excavation of overburden soils, the Engineer shall be notified at least two days in advance to allow observation of the preblast drilling by the Engineer in order to classify the excavation. Visual observation of the completed excavation may be made by the Engineer to modify the excavation classifications. Removal of rock excavation prior to classification by the Engineer shall be

considered as earth excavation unless accepted by the Engineer in writing. Such excavation will be paid on the basis of contract unit rates for this classification.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Gravel fill shall be as specified in Section 02200.

PART 3 – EXECUTION

3.1 PREPARATION FOR BLASTING

A. Blasting shall only be permitted if accepted by the Sudbury Fire Department.

B. All blasting operations, including transportation, handling, storage and protection of detonators and explosives shall comply with the requirements of the Department of Labor, Occupational Safety and Health Administration provisions, as well as those of State and local regulations. In the case of conflict of regulations, the most stringent regulations shall apply.

C. A pre-blast condition survey shall be conducted for all existing structures and conditions on the site, adjacent to the site, or in the vicinity of the site, within the influence range of blasting operations, or within 300-ft of the blast area, whichever is greater, prior to the start of earth/rock excavation or blasting work. This survey shall extend to such structures or conditions as may be affected by the contractor's construction operations. The pre-blast survey shall consist of a close visual inspection, fully supported by photographs or video recordings, performed by, or under the supervision of, a licensed independent professional engineer or geologist experienced in such surveys. The Contractor's insurance underwriter shall be present during such surveys.

The Contractor shall also:

1. Coordinate activities, issue notices, obtain clearance and provide whatever photographic and secretarial assistance is necessary to accomplish the survey.

2. Give seven days' notice in writing, to the owner of the property concerned, and tenants of the property. Advise in notice the dates on which surveys are to be made so that they may have representatives present during the examination. Provide copies of all notices to the Engineer.

3. The survey shall consist of a description of the interior and exterior conditions of the various structures examined. Descriptions shall locate any cracks, damage, or other defects existing and shall include such information so as to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks, damage, or other defects

exist, or for defects too complicated to describe in words, photographs, shall be taken and made part of the record.

4. The Contractor's record of the pre-blast survey shall consist of written documentation and photographs of the condition identified, or a good quality videotape survey with appropriate audio description of conditions and defects. Prior to the start of the work, one copy of the Contractor's record of condition survey shall be submitted to the Engineer for information and retention.

5. The Contractor shall make an examination similar to the preconstruction survey of any properties, structures, and conditions where complaints of damage have been received or damage claims have been filed and give notice to all interested parties so that they may be present during the final examination. Record of the final examination shall be distributed the same as the original preconstruction survey.

6. Any damage noted after completion of blasting operations which cannot be determined from the pre-blast survey to be a pre-existing condition shall be presumed to have been caused by blasting operations. Such damage shall be repaired promptly and completely to the property owner's satisfaction to restore the condition of the property to that existing prior to blasting.

7. Pre-blast survey records shall be maintained for a period of not less than three years following final completion and acceptance of the Work.

D. Indemnity: Notwithstanding full compliance with specifications, as well as the blasting plan, and successful limitation to maximum peak particle velocity and airblast overpressure noted below, the Contractor shall be solely responsible for any damage, direct or indirect, arising from blasting and shall hold the Owner and Engineer harmless from any costs of defense, arising from such damage, real or alleged. The Owner and Engineer shall be additionally named insured on any insurance policy covering blasting carried by the Contractor, and this requirement shall also be enforced on any subcontractor.

E. Qualifications:

1. Persons responsible for blasting shall be licensed blasters in the Commonwealth of Massachusetts and shall have had acceptable experience in similar excavations in rock and controlled blasting techniques.

2. Blast monitoring shall be conducted by an independent, qualified professional engineer or seismologist, trained in the use of a seismograph, and records shall be analyzed and results reported by persons familiar with analyzing and reporting the frequency content of a seismograph record.

F. Codes, Permits, and Regulations:

1. The Contractor shall comply with all applicable laws, rules, ordinances, and regulations of the Federal Government, the Commonwealth of Massachusetts, and the Sudbury Water District, governing the transportation, storage, handling, and use of explosives. All labor, materials, equipment, and services for the blasting operations shall comply with such requirements and shall be provided without additional cost to the Owner.

2. The Contractor shall obtain and pay for all permits and licenses required to complete the work of this section, including permit(s) to transport explosives.

3. In case of conflict between regulations or between regulation and Specifications, the Contractor shall comply with the strictest applicable codes, regulations, or specifications.

4. All blasting shall be in accordance with 527 CMR 13.00.

G. Safety Procedures

1. Clearing the Danger Area before Blasting: No blasting shall be permitted until the Contractor removes all personnel from the danger area to safety. A loud, audible, warning system, devised and implemented by the Contractor, shall be sounded before each blast. The Contractor shall familiarize all personnel on the project, Owner, Police Officers, and Engineer with the implemented system. The danger area shall be patrolled before each blast to make certain that it has been completely cleared, and guards shall be stationed to prevent entry until the area has been cleared by the blaster following the blast.

2. Explosives shall be stored, handles, and employed in accordance with federal, state, and local regulations.

3. No explosives, caps, detonators, or fuses shall be stored on the site during non-working hours.

4. Blasting mats shall be used to cover the top and vertical face of all blasts in order to minimize the possibility of excessive throw of rock. Any damaged mats shall be replaced with mats in good condition before blasting continues.

5. The Contractor shall be responsible for determining all safety requirements unique to blasting operations at these particular sites so as not to endanger life, property, utility service, any existing or new construction, or any property adjacent to the site.

6. No requirement of, or omission to require, any precautions under this Contract shall be deemed to limit or impair any responsibility or obligations assumed by the Contractor under or in connection with this contract; and the Contractor shall

at all times maintain protection to safeguard the public and all persons engaged in the work, and shall take precautions as will accomplish such end, without undue interference to the public. The Contractor shall be responsible for and pay for any damage to adjacent roadways or structures resulting from work executed under this Section.

H. General Blasting Procedures

1. The time during which explosives may be used is restricted to Monday through Thursday between the hours of 9:00 AM and 2:00 PM (prevailing time) allowing ample time for cleanup. The use of explosives is not permitted on Friday, weekends (Saturday or Sunday), holidays, on the eve of a holiday nor between the hours of 2:00 PM and 9:00 AM. In order to minimize traffic disruptions, the Contractor shall schedule blasting such that any two successive blasts detonated anywhere on the project are separated by at least 2 hours.

2. Drill and blast a single line of holes in vertical face of rock at end of trench, when shattering rock at ends of pipe or elsewhere as indicated. Provide minimum depth drillholes of 4 feet and maximum spacing of 18 inches on center. Use sufficient explosive to shatter rock for future excavation. Complete shattering before any pipe or fitting is placed within 50 feet of rock to be shattered.

3. Immediately after blasting, the Contractor shall provide equipment to the site to clear the pavement of blasted rock. The Contractor shall also use a mechanical sweeper and water spray to control dust and small stones.

4. The Contractor shall advise the Owner and Engineer at least two working days in advance of the dates on which he proposes to perform blasting operations, giving the approximate hour, for the Engineer's approval. The Contractor will be responsible for obtaining the permits and police officials required to close local streets during periods of blasting. The Contractor shall notify the Owner and Engineer by noon of the day prior to any day he plans not to blast where the weekly schedule shows a day of blasting. This does not include changes due to weather or unexpected equipment breakdowns.

5. Blast hole diameter shall be no greater than 3 inches.

6. No free flowing, pourable or pumpable explosives shall be used. All explosives shall be in cartridges or other semi-rigid container.

I. DISPOSAL OF ROCK AND BOULDERS

1. Fragmented rock with dimensions not exceeding 6-in in any direction may be mixed with common fill, providing compaction requirements will not be compromised.

2. Rock and boulders may be crushed and screened for reuse in the Work,

provided that the resultant materials meet the requirements for gravel borrow, processed gravel, or crushed stone as specified in Section 02200.

3. Unused rock and boulders shall be removed and disposed of off-site.

END OF SECTION 02212

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SECTION 02550

SIGNAGE

PART 1 – GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment and supervision necessary to complete the work specified in this Section and shown on the Contract Drawings.

1.2 RELATED SECTIONS

A. Drawings and general provisions of the Contract and:

1. Section 03300 – Cast-in-Place Concrete

1.3 SUBMITTALS

A. Submit manufacturers' product information.

1.4 REFERENCES

A. MassDOT, Highway Division Standard Specifications for Highways and Bridges, 1988 with all supplemental specifications.

B. FHA – Manual on Uniform Traffic Control Devices (MUTCD).

C. American Association of State Highway and Transportation Officials (AASHTO).

PART 2 – PRODUCTS

2.1 SIGNS

A. All signs shall be in compliance with the latest revision of the MassDOT, Highway Division specifications.

2.2 CONCRETE

A. All concrete must be 3,000 psi concrete.

2.3 SIGN POSTS

A. All sign posts shall be "breakaway" type and must conform to the latest revision of the MassDOT specifications.

PART 3 – EXECUTION

3.1 SITE SIGNAGE

A. The Contractor shall furnish signs as indicated on the Drawings and install in accordance with manufacturers recommendations and these Specifications.

END OF SECTION 02550

SECTION 02576

PAVEMENT REPAIR AND RESURFACING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section includes the removal and replacement of existing bituminous pavement and sub-base; installation of trench pavement; installation of new bituminous concrete Cape Cod berm where existing is disturbed; removal and replacement of curb and gutter (as required); removal and resetting of curbing (as required); raising and adjusting castings and valve boxes; and installation of pavement markings.

1.2 RELATED WORK

A. Trimming edges of existing pavement for the purpose of excavating trenches shall be by either saw or wheel cutters.

B. Roadway line painting shall be restored to match the conditions prior to construction.

C. Earthwork specifications are included in Section 02200.

1.3 REFERENCE STANDARDS

A. Except as otherwise specified herein, the current Standard Specifications for Highways and Bridges, including all addenda, issued by the Commonwealth of Massachusetts, Department of Public Works, shall apply to materials and workmanship required for the work of this Section.

B. American Association of State Highways and Transportation Officials (AASHTO) AASHTO M144 - Standard Specification for Calcium Chloride.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.4 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTAL PROCEDURES.

1. Product Data: Submit complete data on materials to be used in construction, including gradation tests for granular base.

2. Design Data: Submit design mix for bituminous binder and top (wearing) course.

3. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

1.5 QUALITY ASSURANCE

A. Provide in accordance with Section 01400 and as specified.

B. Laboratory Testing Required:

1. The bituminous mixture shall be compacted to at least 95% of the density achieved on the laboratory testing of the design mix for the project. The density of the Bituminous Concrete Pavement will be determined by using either the following tests; Nuclear Density Gauge Method ASTM D2950 or the Bulk Specific Gravity Method AASHTO-T166.

C. Thickness: Test in-place asphalt concrete courses for compliance with requirements for thickness. Repair or remove and replace unacceptable paving as directed by Engineer. In-place compacted thickness will not be accepted if exceeding the following allowable variation from required thickness:

1. Binder Course: ¼-inch, plus no minus

2. Top Course: ¼-inch, plus no minus

1.6 SEQUENCING AND SCHEDULING

A. Paving on a weekly basis is required unless permission not to do so is received from the applicable permit agency. Trench pavement shall be maintained a minimum of 90 days in local streets.

B. The Contractor shall provide temporary markings on the temporary pavements where existing markings are removed, at no additional cost to the Owner.

C. Use of steel plates require the Contractor to notify the Owner prior to use. If approved, steel plates shall be recessed into the roadway and welded as required.

1.7 PROJECT\SITE CONDITIONS

A. Environmental Requirements:

1. Do not place materials when underlying surface is muddy, frozen, or has frost, snow, or water thereon.

2. Do not place concrete when air temperature at time of placement, or anticipated temperature for following 24 hours, is lower than 40°F or higher than 90°F.

3. Apply prime and tack coats when ambient temperature is above 50°F and when temperature has not been below 35°F for 12 hours immediately prior to application.

4. Binder Course may be placed when air temperature is above 30°F and rising.

5. Grade Control: Establish and maintain required lines and elevations.

B. Existing Conditions:

1. Drawings show approximate locations of paving areas.

2. Drawings show approximate location of existing structures along pipeline route.

1.8 GUARANTEE

A. All final pavement placed in Town streets shall be warranted by the Contractor for a period of one year. During this period all areas which have settled or are unsatisfactory for traffic shall be removed and replaced at no cost to the Town, including the cost of Traffic Police. Settlement in excess of one (1) inch shall be considered significant, and shall be repaired.

1.9 PRICE ADJUSTMENT FOR HOT MIX ASPHALT MIXTURES

A. The price paid to the Contractor for asphalt furnished and installed under this Contract shall be adjusted in accordance with the MassDOT "New Asphalt Period Price Method" (refer to MassDOT document 00811, dated 2/2/09).

B. The price for liquid asphalt shall be as listed on the MassDOT website:

https://www.mass.gov/service-details/2018-massdot-contract-price-adjustments

C. The "Base Price" shall be the price per ton of liquid asphalt on the date of the bid for this Contract. The "Period Price" shall be the price per ton of liquid asphalt on the date asphalt is actually placed under this Contract.

D. The asphalt content for hot mix asphalt mixtures shall be 5.5% (0.055) by weight regardless of percentages established by the Job Mix Formula as described in the Material Section M3.11.03 of the Massachusetts Highway Standard Specifications. The price adjustment will be a separate payment item. It will be determined by multiplying the number of tons of hot mix asphalt placed during the Period by the asphalt content percentage (0.055) times the variance in price between Base price and Period price of asphalt.

PART 2 – PRODUCTS

2.1 MATERIALS

A. All bituminous materials shall conform to Massachusetts Department of Transportation Standard Specifications, Section M3.11.00 – Class I Bituminous Concrete.

B. Calcium chloride shall conform to AASHTO M144, Type I or Type II.

C. Bituminous concrete shall conform to Class I Bituminous Concrete Pavement, Type I-1, of Section 460 of the Massachusetts Department of Transportation Standard Specifications.

D. Proportioning of Bituminous Concrete Mixture: The bituminous concrete mixture shall contain from 5.0 to 6.0 percent by weight of bitumen and from 94.0 to 95.0 percent by weight of mineral aggregates. The percentage of bitumen used shall be as directed within the limits specified.

E. Binder Course and Modified Top Course shall conform to the Massachusetts Highway Department Standard Specifications, Section M3.11.00, Class I, bituminous concrete.

F. Tack coat shall be emulsified asphalt, grade RS-1 and conform to the Massachusetts Department of Transportation Standard Specifications, Section M3.03.0.

G. Cutback asphalt shall conform to the Massachusetts Department of Transportation Standard Specifications, Section M3.02.0.

H. Sub-base material shall be new processed gravel conforming to the Massachusetts Department of Transportation Standard Specifications, Section M1.03.1 “Processed Gravel for Sub-Base”.

I. Mineral aggregate shall conform to Massachusetts Department of Transportation Standard Specifications, Section M3.11.04 – Mineral Aggregate.

J. Pavement markings shall conform to the Massachusetts Department of Transportation Standard Specifications, Section M7.01.03 - White Thermoplastic Reflectorized Pavement Markings and M7.01.04 - Yellow Thermoplastic Reflectorized Pavement Markings.

K. The following MassDOT Standard Items shall apply:

a. Item 151 – Gravel Borrow
b. Item 420 – Hot Mix Asphalt Base Course
c. Item 440 – Calcium Chloride for Roadway Dust Control
d. Item 460 – Hot Mix Asphalt

2.2 CASTINGS

A. Cast Iron shall meet requirements of ASTM A888 “Grey Cast Iron, Cast Iron Class 20.” All castings shall be clean and without blow holes, sand holes or defects of any kind. Cast iron frames and covers shall be clean of all rust, dirt, and scale, and while free and clean shall be given a full coat of coal tar pitch varnish applied hot.

B. Manhole frames and covers shall be at least Class 25 conforming to ASTM A48 "Standard Specification for Gray Iron Castings." Manhole frame shall have a clear opening of 24 inches and be a minimum of 8 inches in height. The surface of the cover shall have a diamond pattern with the words "DRAIN" and “SEWER” as applicable, cast thereon for drainage manholes and sewer manholes, as manufactured by ej 2114Z/2110A1, or equal.

C. Catch basin grates located at low points shall be 24-inch square grate, ej, 5523. Single or dual catch basin grate shall consist of a 24-inch bike-safe square grate ej or approved equal with an 8-inch heavy duty frame (MassDOT Standard). Frames shall be set upon a full bed of mortar, and mortar shall be brought up alongside of frame to provide a water-tight joint.

PART 3 – EXECUTION

3.1 GENERAL

A. Trench pavement shall be installed weekly, on Fridays, or in advance of inclement weather. The trench pavement shall be installed to the limits shown in the Contract Documents.

B. Materials for pavement shall be mixed, delivered, placed, compacted, and tested in accordance with the referenced specification, Sections M3.11 and 460 and as specified herein.

C. Whenever the sub-base becomes dry enough to cause dust problems, spread calcium chloride uniformly over the gravel surface in sufficient quantity to eliminate the dust.

D. No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Engineer.

E. Pavement Construction Period. No pavement shall be constructed during the period from November 15 to April 15, without approval in writing from the engineer.

3.2 PREPARATION

A. Protection of existing Roadways:

1. Saw cut existing pavement to required width and depth to avoid damage to adjacent pavement, curbs, gutters, or other structures and as indicated on the drawings.

B. Sub-Surface Preparation:

1. Pavement Sub-base:

a. Pavement sub-base material shall be as specified in Section 02200, and as shown on the Drawings.

b. The sub-base to be placed under pavement shall be a minimum of 12-inches thick after compaction. Sub-base shall be evenly spread and thoroughly compacted in accordance with the Contract Documents. The sub-base shall be spread in layers not more than 8 - inches thick except the last layer of gravel shall be 4-inches thick, compacted measure. All layers shall be compacted to not less than 95 percent of the maximum dry density of the material as determined by ASTM D1557 Method C at optimum moisture content.

c. Complete sub-base preparation, including dynamic compaction, for full width before placing surfacing materials.

2. Subgrade:

a. Prepare subgrade in accordance with Section 02200.

b. Complete subgrade preparation, including dynamic compaction, for full width before placing surface materials.

c. Stabilize subgrades in accordance with Section 02200 so that loaded construction vehicles do not cause rutting or displacement when depositing materials.

3.3 INSTALLATION

A. General

1. Pavement depths shall be as shown on Drawings or as specified herein.

2. Place bituminous concrete mixture on prepared surface, spread, and strike-off. Spread mixture at minimum temperature of 225˚F (107˚C). Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness. Protect all adjacent construction from staining with mix or damage by mechanical equipment. Clean, repair, or replace nay construction stained or damaged at no additional cost to the Owner.

B. Trench pavement:

1. Trench pavement shall be placed wherever existing pavement has been removed or disturbed as soon as practical after backfilling is completed.

2. The pavement sub-base shall be excavated, graded, and compacted to a sufficient depth below the existing pavement to allow for installation of trench pavement to thicknesses indicated in the Construction Details.

3. Immediately prior to installing trench pavement, the trimmed edges shall be made stable and unyielding, free of loose or broken pieces and all edges shall be thoroughly broomed clean. Contact surfaces of trench sides, curbing, manholes, catch basins, or other appurtenant structures in the pavement shall be painted thoroughly with a uniform coating of bitumen (Specification M 3.11.06, RS-1) just before any mixture is placed against them.

4. Typical pavement sub-base shall be excavated, graded, and compacted to a depth of 3-inches below the existing pavement. The pavement subbase within the limits of South Main Street shall be excavated, graded, and compacted to a depth of 4-inches below the existing pavement.

5. Hose clean with water all road surfaces adjacent to the area to be paved. No paving is to be placed until sub-base surface is dry.

6. Trench pavement in accordance with the Typical Trench Detail shall be a hot mixed binder course placed and compacted to a thickness of 3-inches by steel-wheeled rollers of sufficient weight to thoroughly compact the bituminous concrete without damaging the existing pavement. Trench pavement shall be installed in two lifts. The new pavement shall be rolled smooth and even with the existing pavement.

7. Trench pavement on South Main Street shall be a hot mixed binder course placed and compacted to a thickness of 2-1/2-inches and a hot mixed modified top course placed and compacted to a thickness of 1-1/2 inches by steel-wheeled rollers of sufficient weight to thoroughly compact the bituminous concrete without damaging the existing pavement. The new pavement shall be rolled smooth and even with the existing pavement. Trench pavement shall be installed in two lifts.

8. Pavement shall be machine laid utilizing a sidewalk box spreader or equal; no hand work is allowed.

9. The finished surface, after compaction, shall be true to the established line and grade of the existing pavement.

10. Trench pavement shall be placed weekly over all trenches or as directed by the Engineer.

11. Pavement shall be maintained in a condition suitable for traffic for a period of one year. Defects shall be repaired within 24 hours of notification of such defects.

C. Pavement Placement

1. Unless otherwise permitted by the Engineer for particular conditions, only machine methods of placing shall be used. Methods other than machine methods may be used, at no additional cost to the Owner. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to line, grade, width, and crown. The mixtures shall be placed and compacted only at such times as to permit proper inspection and checking by the Engineer.

2. After the paving mixtures have been properly spread, initial and immediate compaction shall be obtained by the use of steel rollers having a weight of not less than 240 pounds per inch width tread. Begin rolling when mixture will bear roller weight without excessive displacement. Compact mixture with hot tampers or vibrating plate compactors in areas inaccessible to rollers. Accomplish breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material. Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

3. Final rolling of the pavement shall be performed by a steel wheel roller weighing not less than 285 pounds per inch width of tread at a mix temperature and time sufficient to allow for final smoothing of the surface and thorough compaction. Continue rolling until roller marks are eliminated and course has attained maximum density.

4. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas and fill with fresh, hot bituminous concrete. Compact by rolling to match surrounding surface density and smoothness.

5. Immediately after placement of new pavement, make joints between existing and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other section of bituminous concrete course. Clean contact surfaces and apply tack coat. All joints between the existing and new pavements shall be keyed on an angle (4' x 10') or as approved by the Owner, and shall be sealed with bitumen RS-1 and sanded.

6. The Contractor shall furnish and install paving to provide transition or aprons for driveways and walkways impacted by new pavement installation.

D. Pavement Markings:

1. The Contractor shall replace all reflectorized pavement markings removed or covered-over in carrying out the work, and as directed by the Engineer, no sooner than 48 hours after completion of overlay pavement. Markings shall conform to the latest standards of the municipality or agency having jurisdiction over the roadway. The markings shall be thermoplastic markings, 4-inches wide, white or yellow, single or double lines as required for road markings, and 12-inches wide, white for crosswalk markings.

2. Markings shall conform to MassDOT M7.01.03 – White Thermoplastic Reflectorized Pavement Markings and M7.01.04 – Yellow Thermoplastic Reflectorized Pavement Markings.

3. The Contractor shall provide temporary markings on the pavements where existing markings are removed at no additional cost to the Owner.

E. Curb and Gutter Replacement:

1. Replace curb and gutter with same material to pre-construction lines and curb sections. Reset granite curb to pre-construction line and grade.

2. Removal and replacement of curbing shall be done in accordance with Sections 501 and 580, as applicable of the MHD Specifications for Highways and Bridges.

3. Provide expansion joints at each intersection with existing curb sections.

4. Use expansion joints one inch wide. Fill with expansion joint material and cut to shape of curb section.

F. Sidewalk and Driveway Replacement:

1. Gravel sidewalks:

a. Gravel sidewalks shall be restored to a condition at least equal to that existing immediately before the work was started.

2. Bituminous concrete sidewalks and driveways:

a. Construct in accordance with MHD Section 701, Sidewalks, Wheelchair Ramps and Driveways.

b. The subgrade shall be shaped parallel to the proposed surface of the sidewalk or driveway and shall be thoroughly rolled and tamped. All depressions occurring shall be filled with suitable material and again rolled or tamped until the surface is smooth and hard in order for a gravel foundation to be placed upon it.

c. The sidewalk or driveway shall be a minimum of 2-1/2 compacted inches thick, laid in two equal courses.

d. Sidewalk cross slopes can not exceed 2 percent as required by the Americans with Disabilities Act (ADA). The Contractor shall merge new sidewalk slopes into existing sidewalk slopes as required by ADA.

3. Cement concrete sidewalks, and driveways:

a. Construct in accordance with MHD Section 701, Sidewalks, Wheelchair Ramps and Driveways.

b. Use 6x6, W10xW10 welded wire reinforcement.

c. Concrete sidewalks shall be 4-inches thick and concrete driveways shall be 6-inches thick.

d. The subgrade for the walk or driveway shall be shaped to a true surface conforming to the proposed slope of the walk, thoroughly rolled at optimum moisture content, and tamped with a power roller weighing not less than one ton and not more than 5 tons. All depressions occurring shall be filled with suitable material and again rolled or tamped until the surface is smooth and hard.

e. After the subgrade has been prepared, a sub-base of gravel at optimum moisture content shall be placed, thoroughly rolled by a power roller, and tamped. The gravel shall be a minimum of 8 inches in thickness.

f. The forms shall be smooth, free from warp, strong enough to resist springing out of shape, and deep enough to conform to the thickness of the proposed walk or driveway. All mortar or dirt shall be completely removed from forms that have been previously used. The forms shall be well staked, thoroughly braced, and set to the established lines with their upper edge conforming to the grade of the finished walk or driveway.

g. The finished surface shall have sufficient pitch from the outside edge to provide for surface drainage. This pitch shall be 1/4 of an inch per foot unless otherwise directed by the Engineer. Before the concrete is placed, the sub-base for sidewalks shall be thoroughly dampened until it is moist throughout but without puddles of water.

4. General:

a. Valve boxes, manhole frames, and all other castings shall be carefully set to the proposed finished grades.

G. Berms and Waterways

1. Bituminous curbing shall be replaced as required. Curbing shall be machine laid and conform to grade of roadway and adjacent curb areas.

2. Bituminous Cape Cod Berms shall be provided where indicated. Berms shall be machine laid and conform to grade of roadway and adjacent curb areas. Curbing shall be placed monolithically with the top course.

3. Bituminous waterways which have been disturbed by construction operations shall be repaired or replaced. The waterways shall be repaired and constructed in accordance with the applicable requirements of Section 280 of the MHD Specifications. Waterways shall be placed in two 1-1/2-inch thick courses on a prepared gravel base. Material shall be compacted by tamping or rolling.

3.4 RAISING BOXES AND CASTINGS

A. Prior to placing pavement, the Contractor shall raise all castings, gate boxes, utility castings, as required, to proper grade.

B. Contractor shall coordinate with all utility companies to obtain their requirements on castings.

C. Castings which need to be raised or adjusted to complete top course paving shall be done immediately prior to paving.

3.5 PROTECTION

A. Protect replacement work with barricades or other devices as approved by Engineer so that no damage occurs as a result of subsequent construction operations.

1. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

2. Repair damages or other irregularities to satisfaction of Engineer, at no additional cost to the Owner, before final acceptance by the Engineer.

3.6 CONTRACT CLOSEOUT

A. Provide in accordance with Section 01700.

END OF SECTION 02576

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SECTION 02616

DUCTILE IRON PIPE AND FITTINGS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish all materials, equipment, labor and incidentals; provide for the installation and testing; of all ductile-iron pipe and fittings, as indicated and specified.

1.2 RELATED WORK

A. Earthwork included in Section 02200.

B. Fire hydrants, valves and appurtenance specifications are included in Section 02640.

C. Water service connection specifications are included in Section 02725.

1.3 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTAL PROCEDURES:

1. Submit shop drawings or descriptive literature, or both, showing dimensions, joint and other details for each type and class of pipe, fitting and restraint system to be furnished for the project. All materials furnished under the Contract shall be manufactured only in accordance with the Specifications. Submittals shall include material information, dimensions, pipe class information, weights, coating and lining system data.

2. Submit manufacturer's Certificates of Compliance with these Specifications and certification that the ductile iron pipe and fittings have been manufactured and tested in accordance with AWWA/ANSI specifications.

3. Submit the vendor's name, address and contact phone number for all materials to be furnished under the contract.

4. Submit a detailed description of proposed testing, flushing and disinfection procedures to be used for this project. The description shall contain the name of the person responsible for the testing, flushing and disinfection work, equipment to be used, chemical to be used, method of measuring flow during flushing procedures and the name of the laboratory to be used for analysis. Review of the description shall not be construed as approval of any methods to be used; the Contractor shall be fully responsible for achieving the specified test results.

1.4 QUALITY ASSURANCE

A. Provide in accordance with Section 01400 and as specified.

B. Inspect and test at foundry according to applicable standard specifications.

C. Owner reserves right to inspect and test by independent service at manufacturer's plant or elsewhere at his own expense.

D. Visually inspect and hammer test before installation.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01610.

1.6 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs 60,000 PSI Tensile Strength.

B. American Water Works Association (AWWA)

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings

2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems

3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3-in through 48-in for Water

4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

5. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

6. AWWA C150 – Thickness Design of Ductile-Iron Pipe

7. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water

8. AWWA C153 - Ductile-Iron Compact Fittings for Water and Services

9. AWWA C600 - Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.

10. AWWA C651 - Disinfecting Water Mains

C. American National Standards Institute (ANSI)

1. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Ductile iron pipe shall be that of a manufacturer who can demonstrate at least 5 years of successful experience in manufacturing ductile iron pipe. The pipe shall be equipped with push-on type, restrained joint, or mechanical joint, as required, and shall be made in the United States.

B. Ductile iron pipe shall conform to the latest edition of AWWA C150 and C151, Class 52. The pipe shall be double cement-lined, asphalt seal coated, ductile iron and furnished in 18 (eighteen) foot sections.

C. Gaskets shall meet the material requirements of ANSI/AWWA C111 for mechanical joint gaskets.

D. Fittings shall be compact ductile iron Class 350 Mechanical Joint, conforming to ANSI Specification A21.53 (AWWA C153), latest edition. Fittings shall be suitable for use with restraints as specified hereinafter. Fittings shall be manufactured in the United States. Fittings shall be of the same material and have the same lining and coating as the pipe specified above. All fittings shall be marked with the weight and shall have distinctly cast upon them the pressure rating, the manufacturer's identification, nominal diameter of openings and the number of degrees or fraction of the circle on all bends. Fittings shall be Tyler Union AWWA C153 Compact Fittings, or approved equal.

1. Hydrant tees shall have a rotatable mechanical joint gland on the 6-inch plain end branch to provide positive valve restraint, unless otherwise allowed by the Engineer.

2. Caps and plugs installed in all new work as indicated on the drawings shall be provided with a threaded corporation or bleeder valve so that air and water pressure can be relieved prior to future connection.

E. All pipe and fittings shall have a bituminous outside coating in accordance with AWWA C151 and C110, respectively. All pipe and fittings shall be cement-mortar lined and seal coated in accordance with AWWA C104, latest addition. Cement mortar lining shall be double thickness.

F. Joints for pipe and fittings shall be push-on or mechanical joints conforming to AWWA C111, latest edition.

G. Restraint joints shall be furnished for thrust restraint for installation on all fittings and valves, where indicated on the drawings, or where required by the Engineer. Restraints for mechanical joints shall be Series 1100 Megalug as manufactured by EBAA Iron, ONE-LOK Series D-Slide Restraints as manufactured by SIGMA Corp., or approved equal.

H. Restraints for push-on joints shall be Field Lok gaskets by U.S. Pipe or Sure Stop 350 by McWane Ductile. Push-on joint restraints shall not affect the warranty by the pipe manufacturer.

I. Sleeve type couplings shall be of steel and shall be Style 38 by Dresser Mfg. Div.; Smith-Blair Style 441 or approved equal. Couplings shall be furnished with black steel bolts and nuts and with pipe stop removed. Gaskets shall be of a material suitable for exposure to liquid within the pipe.

J. Polyethylene pipe encasement shall conform to requirements of AWWA C105, latest edition. Virgin polyethylene shall conform to ANSI/ASTM D1248. Minimum nominal thickness shall be 8 mils. Polyethylene pipe encasement shall be V-BIO Poly as manufactured by U.S. Pipe and Foundry Company, or equal.

K. Insulation shall be 2-inch thick polyisocyanurate foam with a density of 2.0 lbs/cf^3. A 30-mils thick bitumen adhesive shall be used as a vapor and moisture barrier for direct burial applications.

2.2 BURIED UTILITY WARNING AND IDENTIFICATION TAPE

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

PART 3 – EXECUTION

3.1 HANDLING PIPE

A. The Contractor shall take care not to damage pipe by impact, bending, compression, or abrasion during handling, and installation. Joint ends of pipe especially shall be kept clean.

B. Pipe shall be stored above ground at a height no greater than 5 feet, and with even support for the pipe barrel.

C. Only nylon-protected slings shall be used for handling the pipe. No hooks or bare cables will be permitted.

D. Gaskets shall be shipped in cartons and stored in a clean area, away from grease, oil, heat, direct sunlight and ozone-producing electric motors.

3.2 LAYING DUCTILE IRON PIPE AND FITTINGS

A. The Contractor will be responsible for transporting materials to the job site as needed. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe, lining or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer. Handling and laying of pipe and fittings shall be in accordance with the manufacturer's instruction and as specified herein. Any materials damaged during loading, transporting or unloading shall be replaced at the Contractor's expense.

B. Jointing of ductile iron pipe and fittings shall be done in accordance with the printed recommendations of the manufacturer and as specified. All pipe and fittings shall be thoroughly cleaned before laying; shall be kept clean until they are used in the work; and when installed, shall conform to the lines and grades required. Special care is required in cleaning the ends of the pipe; wipe the outside of the spigot end with a clean rag prior to applying lubricant; brush clean the inside of the bell end, paying special attention to the rubber joint area, prior to installing the gasket and lubricant; and check inside the pipe for overall cleanliness.

C. Ductile iron pipe and fittings shall be installed in accordance with requirements of AWWA C600 except as otherwise provided herein. The joint surfaces and the gasket shall be painted with a lubricant just prior to making up the joint. The spigot end shall then be gently pushed home into the bell. The position of the gasket shall be checked to insure that the joint has been properly made and is watertight. Care shall be taken not to exceed the manufacturer's recommended maximum deflection allowed for each joint. A firm, even bearing throughout the length of the pipe shall be constructed by tamping selected common fill at the sides of the pipe up to 1-foot over the top of the pipe unless laying pipe in rock (See Detail Sheet/Drawings). A 5-foot minimum cover shall be maintained over the top of the pipe. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his/her own expense.

D. All pipe shall be sound and clean before laying. When laying is not in progress, including lunch time, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. Fittings, in addition to those shown on the Drawings, shall be provided, if required, for crossing utilities which may be encountered upon opening the trench. Solid sleeves shall be used only where approved by the Engineer.

E. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be jointed with a bell shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.

F. The Contractor shall have on hand at the start of the job, the following additional bends for each size of pipe to be installed: two 1/32 bends, two 1/16 bends and two 1/8 bends. These bends shall be replaced each time job conditions require their use.

G. Existing Utilities. To the extent possible, the Contractor shall maintain a minimum 10 ft. lateral separation between new water mains and any existing sanitary sewer, except when it is necessary to cross an existing sewer, or unless otherwise directed by the Engineer.

H. When crossing an existing sanitary sewer, the water main is preferred to cross above the sewer. The Contractor shall maintain an 18-inch clearance between the bottom of the water main and crown of the sanitary sewer. At crossing, the center of a full length of water pipe shall be located above the sewer so that both joints will be located as far from the sewer as possible. The engineer may direct this full length of main to be concrete encased when the 18-inch clearance is not possible, or when the water main is placed below the sanitary sewer.

I. The Contractor shall maintain a minimum clearance between the new water main and all other existing utilities of at least 12 inches.

J. New water mains shall pass under all existing utilities except sewers unless otherwise noted on the Drawings or directed by the Engineer.

K. Ductile iron pipe installed within 3 feet of gas lines shall be fully encased with polyethylene material. Polyethylene shall be 8-millimeters thick and comply with AWWA C105.

L. Ductile iron pipe shall be wrapped in polyethylene encasement where pipe depth is at or below normal groundwater level, in accordance with the Drawings.

M. Water pipe, to be installed with less than 5-foot cover or where shown on the drawings, shall be wrapped with an insulating foam jacket suitable for direct burial applications.

3.3 PUSH-ON JOINTS

A. Push-on joints shall be made in accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. Apply thin film of nontoxic gasket lubricant over inner surface of gasket in contact with spigot end. The plain end of the pipe to be laid shall then be aligned and inserted in the bell of the pipe to which it is to be joined and pushed home with a jack

or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

3.4 MECHANICAL JOINTS

A. Mechanical joints shall be made in accordance with Appendix A of AWWA C111 and the manufacturer's instructions. Wire brush surfaces to be in contact with the gasket and thoroughly clean and lubricate the joint surfaces and rubber gasket with soapy water before assembly. After bolts inserted and nuts made finger-tight, tighten diametrically opposite nuts progressively and uniformly around joint by torque wrench. Bolts shall be tightened to the specified torque. Under no conditions shall extension wrenches or pipe over handle of ordinary ratchet wrench be used to secure greater leverage.

3.5 RESTRAINED JOINTS

A. Mechanical joint restraints shall be installed in full accordance with the manufacturer’s instructions. All bolt heads on Megalug restraints shall be tightened sufficiently so that they shear off to provide indication that proper tightening torque was achieved.

B. Push-on joint restraints shall be installed in full accordance with the manufacturer’s instructions where directed by the Engineer.

3.6 SLEEVE TYPE COUPLINGS

A. Couplings shall be installed where shown. Couplings shall not be assembled until adjoining push-on joints have been assembled. Clean pipe ends for a distance of 8 inches. Mark each end six inches from the end. Use soapy water as gasket lubricant. Slip follower and gasket over each pipe to the 6-inch marks. Place the middle ring on the pipe end until centered over joint. Insert other pipe end into middle ring and bring to the proper position in relationship to the pipe installation. Press gaskets and followers into middle ring flares. Check gaskets have been seated into middle ring flares correctly. With bolts inserted and nuts made finger-tight, tighten diametrically opposite nuts sequentially with a torque wrench to the specified torque as per manufacturer’s recommendation. After installation, apply a heavy bitumastic coating to bolts and nuts.

3.7 CONNECTIONS TO WATER MAIN

A. The Contractor shall make all connections to the existing mains as indicated in the Contract Documents.

B. The Contractor shall develop a program for the construction and putting into service of the new work subject to the approval of the Engineer. All work involving cutting into and connecting to the existing water mains shall be planned so as to interfere with operation of the existing facilities for the shortest possible time.

C. The Contractor shall have all preparatory work done prior to making the connection and shall provide all labor, tools, material, and equipment required to do the work in one continuous operation.

D. The Contractor shall have no claim for additional compensation, by reason of delay or inconvenience, for adapting his operations to the requirements of the Owner.

E. Under no circumstances shall any customer be without water for a period of more than 4 hours without prior written approval of the Owner. Should it appear that any customer will be without water for more than 4 hours, the Contractor shall install temporary water service at no additional cost to the Owner.

F. The Owner does not guarantee a tight shut-off for existing local community water valves. The Contractor shall not submit a claim for damages due to delays in dewatering pipelines caused by water leaking through an existing closed valve, or having to dewater the excavation while making the connection. It is the Contractor's responsibility to provide the means to dewater the excavation while making the connection.

3.8 TESTING AND DISINFECTION

A. Prior to pressure and leakage tests, the piping shall be thoroughly flushed clean of all dirt, dust, oil, grease, and other foreign materials. This work shall be done with care to avoid damage to lining and coatings.

B. The Contractor shall submit to the Engineer a plan on the method of testing and chlorinating the mains for review. The plan shall include all equipment proposed for use during the work, or the name of the qualified testing company which will perform the work. Testing of the water main shall not begin until the Contractor's plan has been approved by the Engineer. All testing shall be done in the presence of the Engineer.

C. Testing of Water Main:

1. The Contractor, in accordance with ANSI/AWWA C600 specifications or latest revision thereof, will make all pressure and leakage tests to determine that the ductile iron pipe is structurally safe and free of excess leakage. The Contractor shall furnish all the equipment, materials and labor required for testing. The Contractor shall furnish, at his own expense, all the water needed for all water main testing.

2. Testing shall be done in sections of the main not to exceed a 3,000-foot maximum length. Valves shall be placed in the off position at the ends of the sections to be tested. The Contractor shall provide means to prevent water from entering other parts of the pipeline not subject to testing at all times. Contractor will ensure that air release valves and other venting devices are

properly installed and placed in open position when filling pipe with water. Taps shall be installed at high points to release air in the water system.

3. After all entrapped air has been removed from the section; fill the main to the normal static pressure. The Contractor is allowed to let the main rest for up to 48 hours with static pressure. Using a special pressure pump, the Contractor shall raise the pressure to 150 pounds per square inch. The pump will then be shut off and separated from the test section by a globe valve. A fluid filled pressure gage, with a maximum reading of 250 psi, shall have been placed beyond the globe valve. The test section will then be monitored for a 2-hour period.

4. This pressure shall be maintained, within 5 psi, for a minimum of 2 hours during which time the line checked for leaks by the Engineer. Based on an average test pressure of 150 psi, the measured rate of water leakage shall not exceed the following rates in the section under test:

$$L = \frac{12.25SD}{133{,}200}$$

Where: L = Allowable leakage, gallons per hour
S = Length of pipe section tested, feet
D = Nominal pipe diameter, inches

5. Should leakage exceed this rate, the Contractor shall immediately locate the leak or leaks and repair same at his expense. Pipe shall be flushed and chlorinated when leakage does not exceed above standard. Approval does not absolve the Contractor from his responsibility if leaks develop within the new main or water services (to curb box) later within the warranty period.

D. Chlorinating and Flushing:

1. The Contractor, in accordance with the latest edition of ANSI/AWWA 651 Standard for Disinfecting Water Mains, shall chlorinate and flush the new water main. Chlorinated water to be flushed from the pipeline shall be de-chlorinated as shown on detail drawings or as approved by the Engineer. It shall then be discharged to the nearest storm drain. Chlorinated water shall not be discharged to any natural water body.

2. Prior to chlorination, the Contractor shall properly flush the water mains. In general, flushing shall be performed at a flow rate required to achieve a minimum velocity of 3 feet per second, which is approximately 400 GPM in an 8-inch diameter main, 600 GPM in a 10-inch main, 900 GPM in a 12-inch main and 1,600 GPM in a 16-inch main. Flushing of the water main, at the above rates, for approximately 20-minutes per 1,000-foot section, will allow for three volume changes. This is a sufficient period of time for successfully cleaning the water main.

3. The Contractor shall chlorinate the water main until the main contains a solution containing 25 mg/L available chlorine. The valves shall then be closed and the chlorinated water allowed to sit in the mains for 24 hours. The main will then be checked to assure the chlorine residual shall be at least 10 mg/L. If less than 10 mg/L is measured, the Contractor shall flush and re-chlorinate the mains at no cost to the Owner. All valves and hydrants shall be operated to insure their proper disinfection. Valves shall be operated to prevent super chlorinated water from entering the existing distribution system. The Contractor shall then flush the mains until clear, clean water is being discharged.

4. Sixteen hours after the main has been flushed of chlorinated water, bacteriological samples (total coliforms and heterotrophic plate count) shall be taken. Two sample events shall occur. The first sample event from the designated locations shall be taken and the second sample event shall be taken from the same designated locations a minimum of 15 minutes apart. Both sets of samples shall pass. Water samples shall be taken from corporation stops along the length of the water main as designated by the Engineer. A minimum of two (2) samples shall be taken on each street, or two per 3,000 feet of pipe, whichever is greater. Each sample shall be taken in duplicate, in sterile bottles and sent to a State approved private laboratory for analysis. The Contractor shall perform all necessary work including delivery of samples to a certified laboratory, and shall include the cost for sampling and analysis in his bid price. The results of the tests on these samples will determine the acceptance of the work and allow these new mains to be connected to the Town's system. The failure of any sample to pass the laboratory tests shall require the Contractor to reflush and re-chlorinate the mains and resample and test the water until acceptable results are obtained, all at no additional cost to the Owner.

5. If, during construction, trench water has entered the main, or if in the opinion of the Owner's Engineer, excessive quantities of dirt or debris have entered the main, bacteriological samples shall be taken at 200-foot intervals and shall be identified as to location. Additional sample taps shall be installed and removed at the Contractor's expense.

6. Contractor shall note that work under this Contract shall not be considered complete until the satisfactory installation and testing of the water mains have been completed.

END OF SECTION 02616

SECTION 02640

FIRE HYDRANTS, VALVES, AND APPURTENANCES

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The work covered under this section includes the furnishing of all plant, labor, equipment, appurtenances and materials, and in performing all operations in connection with installing and testing of the valves, hydrants, and appurtenances, at the locations indicated and/or as directed, complete in place in accordance with the drawings and specifications.

B. Where existing gate boxes and hydrants are to be removed the contractor is responsible for disposal.

1.2 RELATED WORK

A. Earthwork is included in Section 02200.

B. Rock excavation is included in Section 02212.

C. Ductile iron pipe and fittings are included in Section 02616.

D. Water service connections are included in Section 02725.

1.3 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300 - SUBMITTAL PROCEDURES:

1. Submit shop drawings and descriptive literature, showing valve dimensions and other details for each type and class of valve to be furnished.

1.4 REFERENCE STANDARDS

A. American Water Works Association (AWWA)

1. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

2. AWWA C500 - Gate Valves for Water and Sewerage System.

3. AWWA C502 - Dry-Barrel Fire Hydrants

4. AWWA C504 - Standard for Rubber-Seated Butterfly Valves.

5. AWWA C509 – Standard for Resilient Seated Gate Valves for Water Supply Service

6. AWWA C515 – Standard for Reduced-Wall, Resilient Seated Gate Valves for Water Supply Service

B. Underwriters Laboratory (UL)

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Resilient wedge gate valves shall be iron body, resilient seated type meeting the latest edition of AWWA C509 or AWWA C515 with mechanical joint ends. The valves shall be designed for 200 psi working pressure and 400 psi test pressure. Valves shall have corrosion resistant fusion - bonded interior and exterior coatings.

B. Valves are to have O-ring seals and a non-rising stem. Valves shall have a 2-inch square operating nut, and be Open Left (counter-clockwise to open).

C. Valves shall be as manufactured by Mueller Company, American Flow Control, or equal.

D. Valve boxes shall be cast iron, asphalt coated, sliding type, adjustable, together with cast iron covers with the word “WATER” and a direction-to-open arrow plainly cast in relief on the top surface. A minimum 6-inch overlap is required between sliding sections. The inside diameter of the bottom section shall be at least 5-1/4-inches and shall have a belled base. The top section shall be at least 6-1/8-inches and have top flanges. The bottom section shall be at least 36-inches in length. The top section shall be at least 26-inches in length and have a plain bottom. No three piece combinations shall be acceptable. Valve boxes shall be manufactured in North America only.

E. Fire hydrants shall have mechanical joint inlet connections to the main, two 2-1/2-inch hose connections, and one 4-1/2-inch steamer connection with a valve opening 5-1/4-inches in diameter minimum and a standpipe with an 8-1/2-inch minimum diameter. Hydrants shall be traffic model with dual drain ports

F. The hydrants shall have an oil reservoir to provide lubrication to all stem threads, bearing surfaces and O-rings each time the hydrant is operated.

G. The hydrants shall have mechanical joint shoes, 5'6" bury (street level shoulder areas), 5-1/4-inch valve, and conform to AWWA Specification C-502. Hydrant shall be marked with an arrow and the word "open" to indicate the direction to turn the stem to open the hydrant. Hydrants shall open right.

H. The hydrants are to receive two coats of prime paint before shipment and once installed are to be cleaned and painted by the Contractor. Hydrants shall be painted in accordance with the Sudbury Water District requirements.

I. Hydrants shall be Mueller Co. Centurion Model A-423, American Darling, Model #B62B, or approved equal.

J. Hydrants shall have hydrant markers with reinforced fiberglass shaft heavy duty spring mounted 4' long x 3/8" diameter. One bolt mounting.

K. Tapping Sleeves shall be manufactured by Mueller Co., Clow Corporation, or approved equal. Tapping sleeves shall match the requirements of the detail on the construction drawings. Tapping valves shall be manufactured by Mueller Company, Kennedy Valve Manufacturing Company or equal and shall be furnished with one flange end and one mechanical joint end. Valves shall open left. The Contractor shall verify the outside diameter of the pipe to be tapped.

PART 3 – EXECUTION

3.1 INSPECTION AND PREPARATION

A. All valves and appurtenances shall be installed in the location shown on the drawings or where directed by the Engineer. Valves shall be true to alignment and rigidly supported. Any damaged items shall be replaced before they are installed.

B. During installation of all hydrants, valves and appurtenances, the Contractor shall verify that all the items are clean, free from defects in materials and workmanship and functioning properly. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced.

C. All valves shall be closed and kept closed until otherwise directed by the Engineer. All hydrants shall be covered with a burlap bag until put into service.

D. Care shall be taken to avoid freezing of water in valves or hydrants.

3.2 FIELD TESTS AND ADJUSTMENTS

A. Conduct a functional field test of each valve, including actuators and valve control equipment, if any, in the presence of the Engineer to demonstrate that each part and all components together function correctly. The Contractor shall provide all testing equipment.

3.3 MANUFACTURER'S SERVICE

A. The Contractor shall coordinate the services of a qualified representative of the tapping equipment and/or tapping valve supplier to provide on-site support and

assistance during wet tapping operations of the existing water mains as indicated on the Drawings.

3.4 SHOP PAINTING VALVES AND APPURTENANCES

A. Interior and exterior surfaces of all valves which are not factory epoxy coated shall be given two coats of shop finish of an asphalt varnish conforming to the latest edition of AWWA C504 for Varnish Asphalt. The pipe connection openings shall be capped to prevent the entry of foreign matter prior to application.

3.5 INSTALLATION OF FIRE HYDRANTS

A. Furnish all labor, equipment and incidentals required for the installation of fire hydrants and valves as shown on the Drawings and/or as directed by the Engineer. The Engineer will request hydrant location staking from the Water Division with reasonable notice (minimum 3 days). Engineer will set two stakes on the road right-of-way (ROW) line, spaced equal distance on either side of the property corner or other location as determined by the Engineer. The ideal location for the hydrant would be just inside the ROW line, at the property corner (halfway between the two stakes). The hydrant should be entirely inside the ROW. Deviation to one side or the other from this property corner location should be kept to a minimum, and only when required due to obstruction or other undesirable field condition. Hydrants shall be installed as a complete unit, including 6-inch gate valve, where designated by the Contract Drawings with the consent of the Engineer. All hydrants shall stand plumb and shall have their nozzles parallel with, or at right angles to the curb, with the nozzle facing the curb. Hydrants shall be set to the established grade, with the centerline of the lowest nozzle 18-inches above the ground. The Hydrants shall be set upon a slab of concrete not less than 4-in. thick and 15-in. square.

B. Concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be 36 square inches. Felt roofing paper shall be placed around the hydrant elbow before placing concrete. CARE SHALL BE TAKEN TO INSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS.

C. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve. The Contractor shall notify the Fire Department when a hydrant is taken out of service, for removal or replacement. When hydrants are removed from service, the pipe shall be cut below grade and the old hydrant disposed of by the contractor. No hydrant shall be left out of service overnight.

D. When a dry-barrel hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing course gravel or crushed stone mixed with course sand from the bottom of the trench to at least six (6) inches above the drain port opening in the hydrant and to a distance of one (1) foot around the elbow.

E. When a dry-barrel hydrant with a drain opening port is set in clay or other impervious soil, a drainage pit, two (2) feet x two (2) feet x two (2) feet, shall be excavated below each hydrant and filled with course gravel or crushed stone mixed with course sand under the elbow of the hydrant and to a level of six (6) inches above the drain port. Said installation will be to the detail shown on the Drawings.

F. Where existing hydrants are to be connected to a new or existing water main, no extras shall be paid for excavating the water main and preparing same for tapping, etc. Line items for wet taps, D.I. pipe, asphalt, and all other items shall be paid per the Table of Bid Prices.

G. Fire hydrants shall be painted in accordance with the Water Division requirements.

3.6 FIELD TESTS AND ADJUSTMENTS

A. Conduct a functional field test of each valve, including actuators and valve control equipment, if any, in the presence of the Engineer to demonstrate that each part and all components together function correctly. The Contractor shall provide all testing equipment.

3.7 INSTALLATION OF BURIED VALVES AND VALVE BOXES

A. The Contractor shall furnish all necessary labor and equipment to excavate and expose the watermain sufficiently to install valves and/or tapping valves as required by the Engineer.

B. Valves shall be cleaned and manually operated before installation. When tapping valves are installed, it is imperative that the shell cutting is removed and discarded. Valves shall be set on a firm foundation and supported by tamping pipe-bedding material under the sides of the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with the finished grade. Buried valves and valve boxes shall be set with the stem vertically aligned in the center of the valve box. The valve box shall be set so as not to transmit loads to the valve.

C. Where ductile iron tapping sleeves are used, the split end flanges shall be rotated off center of the flange body to insure the gasket seams are not aligned.

D. Tapping valves shall be thoroughly flushed after the tapping operation has been completed.

E. Before backfilling, all exposed portions of any bolts shall be coated with two coats of bituminous paint comparable to Bitumastic No. 50 by Koppers Co., Inc. or equal.

END OF SECTION 02640

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SECTION 02725

WATER SERVICE CONNECTIONS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The work covered under this Section of the Specification includes furnishing all plant, labor, equipment and incidentals required in tapping (regardless of size) and performing all operations necessary to provide new water services from the new water main to the property line, including corporation stops, curb stops and boxes, as shown on the Drawings or as directed by the Engineer. In general, a service shall be brought to each developed parcel of property along the water main route. Trench excavation and backfilling shall be done in accordance with all of the applicable sections of these Specifications.

B. Corporation cocks shall be installed for connecting all service to the new water mains. The Contractor shall keep a record of the locations of all corporation cocks installed and shall indicate on the record those corporation cocks that have not been connected to service piping. A copy of this record shall be given to the Engineer at the completion of the work. Copper tubing, curb stops and necessary adapters shall be used to make connections between new corporation cocks and new and existing service piping. The Contractor shall be responsible for the removal and/or installation of curb stops in the locations directed by the Engineer.

C. All existing services shall be maintained until the new service connections have been fully installed, chlorinated and tested to the satisfaction of the Engineer. All service connections shall then be made to the mains as specified below. The Contractor shall connect each existing house service to the new service connections provided after the completed installation has been accepted by the Engineer. All abandoned services shall have ends crimped.

D. All service fittings, corporations and curb stops shall be provided with no lead meeting the current NSF requirements.

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product Data: Submit manufacturer's technical product data and installation instructions for materials and products.

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D2737 - Standard Specification for Polyethylene (PE) Plastic Tubing

B. American Water Works Association (AWWA)

1. AWWA C800 - Underground Service Line Valves and Fittings.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 – PRODUCTS

2.1 MATERIALS

A. All water service plumbing material shall be “lead free” in accordance with Section 1417 of the Safe Drinking Water Act and Section 9 of NSF Standard 61.

2.2 SERVICES

A. Unless otherwise specified, all pipes for services shall be 1” P.E. tubing with a 200 psi or greater rating and shall conform to the provisions of ASTM D2737 (latest version).

B. Tracer wire shall be installed along with all water services.

2.3 CORPORATIONS, CURB STOPS AND SADDLES

A. The corporation stops shall meet the most recent revision of the AWWA standard "Threads for Underground Service Line Fittings" (AWWA C800). Corporation stops shall be Mueller 300 Ball Corporation Valve, Model B-25008N, as manufactured by Mueller Company, The Ford Meter Box Company, or approved equal. Corporations larger than one inch shall be installed with saddles.

B. The curb stops shall meet the most recent revision of the AWWA standard "Threads for Underground Service Line Fittings" (AWWA C800). Curb stops shall be Mueller 300 Ball Curb Valve, Model B-25209N as manufactured by Mueller Company, Ford Meter Box Company, or approved equal. Curb Stops shall open Left.

C. The curb box shall be of the “Erie” type, cast-iron construction. The curb box shall be tar base enamel coated inside and out and shall be equipped with a 30” stainless steel operating extension rod. The lid shall be of extra heavy cast-iron construction with a brass pentagon plug. Curb stop boxes shall be manufactured in North America only.

D. Service saddles (for services larger than one inch) shall be Smith-Blair 313 Double Strap. Bodies shall be ductile iron and straps shall be electrogalvanized carbon steel. Units shall be complete with Buna-N gaskets.

2.4 FITTINGS

A. Unless otherwise approved, only compression type fittings manufactured by Mueller Inc., or equal, shall be used.

B. Adapters required to allow connection to existing services shall be provided.

PART 3 – EXECUTION

3.1 INSTALLATION

A. After successful testing and chlorination, water services shall be installed as a "wet" tap as shown on the Drawings, specified, or directed by the Engineer. Exact locations of services shall be located in the field by the Engineer. All existing services shall be connected to the curb stop installed under this Contract. All services shall be installed to a minimum depth of 5'-0" unless specifically shown or directed otherwise by the Engineer.

B. Corporation cocks. The tapping machine shall be rigidly fastened to the pipe. The length of travel of the tap should be so established that when the stop is inserted and tightened with a 14-in wrench, not more than one to three threads will be exposed on the outside. When a wet tapping machine is used, the corporation cock shall be inserted with the machine while it is still in place. Stops shall be tightened only sufficiently to give watertightness and care must be constantly exercised not to overtighten them.

C. Saddle taps shall only be used for services larger than one inch or when transite (asbestos cement) pipe, PVC pipe, or HDPE pipe is encountered or under the direction of the Engineer.

D. Straight couplings. The Contractor shall install straight couplings to existing water mains of the sizes required in the locations designated by the Engineer in the field. The Contractor shall utilize the manufacturers recommended installation procedures while performing the work. Care shall be taken to ensure a watertight connection.

E. Curb stops will, in most cases, be installed 1.5-ft from the curb line or pavement limit. The Contractor shall install the curb cocks and boxes in a workmanlike manner as described herein and as directed by the Engineer and shall place compacted-screened gravel around and below the cock to permit ready draining of the pipe through the waste opening.

F. The boxes shall be set in a true vertical position and if they are within the limits of the roadway or within limits where the plowing of snow will take place in the winter, the tops of the boxes shall be set about 1/2-in below the top of the finished grade. In

locations where these boxes are not likely to be disturbed, the tops shall be set flush with the adjoining ground.

G. Care shall be exercised in the placing and laying of water service tubing to be sure that the pipe does not have kinks or sharp bends and to assure against it being in contact with sharp stones or ledge which would cause damage to the pipe. Service shall be installed with a minimum 6 inches of sand bedding and 12 inches sand cover.

H. For existing service connections that are less than 1-inch, the change over to the new main shall occur at the new 1-inch tap (1" to 3/4"). If any extensions are required to reach the existing water service, they shall match diameter in kind, except be no less than 1-inch. Water service tubing as specified herein shall be used to make connections between new corporation stops and new curb stops at the property line. If the service connection is greater than 1-inch, the same size water service tubing connection shall be installed. The Contractor shall be responsible for the removal and/or installation of curb stops and boxes in the locations directed by the Engineer.

I. The transfer of water connections from the old services to the new services shall be performed as quickly as possible in order to minimize the time in which water service is disrupted.

C. Unless otherwise specified, all pipes for services shall be 1” P.E. tubing with a 200 psi or greater rating and shall conform to the provisions of ASTM D2737 (latest version).

J. Water service trenches shall be excavated and backfilled in accordance with Section 02200 of this Specification and in conformance to the details. Services to be installed beneath paved roadways may be driven beneath the pavement utilizing a pneumatically driven device such as "Hole Hog", or equal. All copper tubing shall be backfilled with sand by hand to 12” above tubing.

END OF SECTION 02725

SECTION 02901

MISCELLANEOUS WORK AND CLEANUP

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to do the miscellaneous work not specified in other sections but obviously necessary for the proper completion of the work as shown on the Drawings.

B. When applicable the Contractor shall perform the work in accordance with other sections of this Specification. When no applicable specification exists the Contractor shall perform the work in accordance with the best modern practice and/or as directed by the Engineer.

C. The work of this Section includes, but is not limited to, the following:

1. Furnishing a magnetic locator, a pipe locator, and grounding reel.

2. Installing and maintaining construction warning signs.

3. Crossing and relocating existing utilities.

4. Restoring of driveways and sidewalks.

5. Cleaning up.

6. Incidental work.

7. Job photographs.

8. Protection and/or removal and reinstallation of existing signs, lampposts, fence posts, fencing and mailboxes.

9. Protection and bracing of utility poles.

10. Restoration and replacement of curbing.

11. Raking and re-seeding of grassed areas disturbed during construction and/or dewatering activities, including silt basin/dewatering activity areas. Loam and seed placed on the utility trench area will be paid separately under specified item in bid proposal.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Materials required for this Section shall be the same quality of materials that are to be restored. Where possible, the Contractor may re-use existing materials that are removed.

PART 3 – EXECUTION

3.1 INSTALLING AND MAINTAINING CONSTRUCTION WARNING SIGNS

A. Construction work zone traffic control shall be the contractor's responsibility. Generally, conformance with Part VI of the Manual of Uniform Traffic Control Devices (MUTCD), latest edition, "Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations", will be considered to meet this requirement.

3.2 CROSSING AND RELOCATING EXISTING UTILITIES

A. This Item includes any extra work required in crossing culverts, water courses, including brooks and drainage ditches, storm drains, gas mains, water mains, electric, telephone, gas and water services and other utilities. This work shall include but is not limited to the following: bracing, hand excavation and backfill (except screened gravel) and any other work required for crossing the utility or obstruction not included for payment in other items of this specification. Notification of Utility Companies shall be as specified in Section 01046.

B. In locations where existing utilities cannot be crossed without interfering with the construction of the work as shown on the Drawings, the Contractor shall remove and relocate the utility as directed by the Engineer or cooperate with the Utility Companies concerned if they relocate their own utility.

C. At pipe crossings and where designated by the Engineer, the Contractor shall furnish and place screened gravel bedding so that the existing utility or pipe is firmly supported for its entire exposed length. The bedding shall extend to the mid-diameter of the pipe crossed. Payment for screened gravel at pipe crossings will be made according to the unit price bid established in the Bid Form.

3.3 RESTORING OF DRIVEWAYS AND SIDEWALKS

A. Existing public and private driveways disturbed by the construction shall be replaced. Paved drives shall be repaved to the limits and thickness existing prior to construction. Gravel and Sea Shell drives shall be replaced and regraded.

B. The contractor shall restore any sea shell driveway aprons or roadways that are disturbed during construction activities to the extent of the length of disturbance into the property by the complete width of the driveway apron or roadway.

C. Existing public and private sidewalks disturbed by the construction shall be replaced with sidewalks of equal quality and dimension. In general, sidewalks shall be 2-½ inches thick after rolling and compacting and the material shall be top course bituminous asphalt. Sidewalks shall be paid for at the price per square yard shown in the Table of Bid Prices for Initial Paving.

3.4 CLEANING UP

A. The Contractor shall remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall restore the site of the work to a neat and orderly condition. Any materials, and sand or concrete materials shall be cleaned out of the manholes and catch basins. Straw bales and siltfence as well as any silt and debris retained by same shall be removed.

3.5 INCIDENTAL WORK

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

3.6 PHOTOGRAPHS OF PROJECT

A. Prior to the excavation in any street or cross country area, the Contractor may document existing conditions using construction photographs. Photographs for this purpose shall be at the Contractors' expense.

3.7 RESTORATION AND REPLACEMENT OF SIGNS, LAMPPOSTS, FENCE POSTS, FENCING, AND MAILBOXES

A. Existing signs, lamp posts, fence posts, fencing and mailboxes which may be damaged by the Contractor or removed by the Contractor during the course of installing the new pipelines shall be reinstalled in a vertical position at the same location from which they were removed. Damaged items shall be replaced with an item equal to or better then the damaged items. A concrete anchor shall be provided as necessary, at no additional cost, to ensure a rigid alignment. Care shall be exercised in the reinstallation of all items to prevent damage to the newly installed pipelines.

3.8 RESTORATION AND REPLACEMENT OF CURBING

A. Existing concrete, bituminous, timber or granite curbing shall be protected. If necessary, curbing shall be removed and replaced after backfilling. Curbing which is damaged during construction shall be replaced with curbing of equal quality and

dimension at the Contractor's expense. Granite curbing removed and reset shall conform to [Section 580 of the Massachusetts DPW Specifications]. Joints between sections shall be pointed as required after resetting. Bituminous berms shall conform to [Section 501 of the Mass DPW Specifications].

3.9 PROTECTION AND BRACING OF UTILITY POLES

A. The Contractor shall be responsible for making all arrangements with the proper utility companies for the bracing and protection of all utility poles that may be damaged or endangered by the Contractors operations. Work under this item shall include the related removal and reinstallation of guy wires, or support poles whether shown on the Drawings or not.

3.10 RAKING AND RE-SEEDING

A. Grass and landscaped areas disturbed by the Contractor shall be raked and replenished with loam if required. Place topsoil to a minimum depth of 4 inches for areas disturbed by Contractor’s construction operations. Spread evenly and grade to elevations and slopes shown. Hand rake areas inaccessible to machine grading. Use all available on-site stockpiled topsoil and supplement with off-site topsoil as required.

B. Areas shall be re-seeded as required and as directed by the Engineer. Seed mixture shall be fresh, clean, new crop seed. Grass shall be of the previous year’s crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in 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.

END OF SECTION 02901

DIVISION 3

CONCRETE

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this section, including, but not limited to the following:

1. Cast-in-place concrete.

2. Mix designs or use of bagged manufactured grouts and repair mortars and concrete

3. Application of proprietary bonding agents prior to placement of CIP concrete or repair mortars

4. Reinforcing and placement of same

B. General: Submit in accordance with Condition of Contract and Division 1 – General Requirements Specification Section.

1.2 RELATED WORK:

A. Section 03100, Concrete Formwork

1.3 REFERENCES:

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

American Concrete Institute (ACI)

ACI 30l Structural Concrete for Buildings

ACI 302 Recommended Practice for Concrete Floor and Slab Construction

ACI 304 Recommended Practice for Measuring, Mixing, Transporting, and Replacing Concrete

ACI 3042R Placing Concrete by Pumping Methods

ACI 305 Recommended Practice for Hot Weather Concreting

ACI 306 Recommended Practice for Cold Weather Concreting

ACI 308 Standard Practice for Curing Concrete

ACI 315 Details and Detailing of Concrete Reinforcement

ACI 318 Building Code Requirements for Reinforced Concrete

American Society for Testing and Materials (ASTM)

ASTM C31 Making and Curing Concrete Test Specimen.

ASTM C33 Concrete Aggregates

ASTM C39 Compressive Strength of Cylindrical Concrete Specimens

ASTM C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

ASTM C87 Effect of Organic Impurities in Fine Aggregate on Strength of Mortar

ASTM C94 Ready-Mixed Concrete

ASTM C143 Standard Method for Slumps of Portland Cement Concrete

ASTM C150 Portland Cement

ASTM C231 Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C260 Air-Entraining Admixtures for Concrete

ASTM C309 Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C494 Chemical Admixtures for Concrete

B. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply.

1.4 SUBMITTALS

A. General: Submit in accordance with Condition of Contract and Division 1 – General Requirements Specification Section.

B. Six sets of shop drawings of the materials specified herein shall be submitted to the Engineer for review.

C. Submit sources of cement and aggregates and their conformance to referenced standards.

D. Provide one copy of the "Certificate of Delivery" for each load of concrete as it arrives on the site, under the provisions of ASTM C94.

E. Air-entraining admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.

F. Water reducing admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.

G. Mid or high range water-reducing admixture (plasticizer). Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations of use.

H. Sheet curing material. Product data including catalogue cut technical data and conformity to ASTM standard.

I. Liquid curing compound. Product data including catalogue cut technical data, storage requirements, product life, application rate and conformity to ASTM standards. Identify proposed locations of use.

J. Grout. Catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to specified standards.

K. Submit concrete placing sequence to the Engineer for review and comment.

L. Test Report

1. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cementitious materials ratio, type and manufacturer of cement.

    a. Standard deviation data for each proposed concrete mix based on statistical records.

    b. Water-cementitious materials ratio curve for concrete mixes based on laboratory test. Give average cylinder strength test results at 28 days for laboratory concrete mix designs. Provide results of 7 and 14 day tests if available.

M. Certifications

1. Certify that admixtures used in the same concrete mix are compatible with each other and the aggregates.

2. Certify that the Contractor is not associated with the independent testing laboratory nor does the Contractor or its officers have a beneficial interest in the laboratory.

N. Qualifications

1. Independent testing laboratory: Name, address, and qualifications. Laboratories affiliated with the Contractor or in which the Contractor or corporate officers have a beneficial interest are not acceptable.

1.5 DELIVERY, STORAGE AND HANDLING

A. Supply labor, materials, and equipment to the Project at such intervals to ensure uninterrupted progress of the work.

B. Deliver, store and handle materials to eliminate contamination, segregation, damage and deformation. Store materials off the ground on wood dunnage of sufficient height to prevent surface water from coming into contact with stored materials. Materials shall be stored in such a way as to be protected from the elements with waterproof coverings, positioned to provide drainage, and be ventilated to avoid condensation.

C. Materials that would be damaged by contact with water or sunlight shall be stored in a closed, protective environment.

D. Do not deliver concrete to the Project until ready for concrete placement with the exception of pre-blended bagged mixes which shall not be opened and prepared until forms and other such supportive construction and work has been readied for placement. General Contractor shall note the mix time limits for either cast-in-place or pre-blended preparations and arrange for delivery accordingly.

1.6 QUALITY ASSURANCE

A. Only one source of cement and aggregates shall be used on any one structure. Concrete shall be uniform in color and appearance.

B. Damages and imperfections shall be corrected by the Contractor to the satisfaction of the Engineer at no additional cost to the Owner.

C. All field-testing and inspection services required shall be provided by the Owner. The cost of such work, except as specifically stated otherwise, shall be paid for by

owner. Methods of testing shall comply in detailed with the latest applicable ASTM method.

D. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at the Contractor's expense.

E. If, during the progress of the work, the materials from the sources originally accepted change in characteristics, the Contractor shall, at the Contractor's expense, make new acceptance tests of aggregates and establish new design mixes. Such testing and design shall be accomplished with the assistance of a certified independent testing laboratory, retained by the Contractor, acceptable to the Engineer.

PART 2 - PRODUCTS

2.1 CEMENT:

A. The cement shall be an approved brand of American manufactured Portland Cement, Type II conforming to ASTM Cl50. The brand name and type of cement proposed for use shall be submitted to the Engineer for approval immediately following award of contract. Only one color of cement, all of the same manufacture, shall be used for the work.

B. When the use of Portland cement Type III is permitted by the Engineer the same strength requirements shall apply, but the indicated strengths shall be attained in 7 days instead of 28 days.

2.2 AGGREGATES:

A. Except as otherwise noted, aggregates shall conform to the requirements of ASTM C33.

B. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33 and the following additional requirements:

Sieve	Retained Percent
#4	0 to 5
#16	25 to 40
#50	70 to 87
#100	93 to 97

Fineness Modulus	2.80 ($\pm$ 0.20)
Organic	Plate 2 maximum
Silt	2.0% maximum
Mortar Strength	100% minimum Compression ratio

Soundness	5% maximum loss, magnesium Sulfate, five cycles

C. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33 and the following additional requirements:

Designated Size (inches)	3	2	1-1/2	1	¾	½	3/8
Fineness Modulus (+ -0.20)	7.95	7.45	7.20	6.95	6.70	6.10	4.50

Organic	Plate 1 maximum
Silt	1.0% maximum
Soundness	5% maximum loss, magnesium Sulfate, five cycles

Grading requirements shall be as listed in ASTM C33, Table 2 for the size number corresponding to the appropriate maximum coarse aggregate size. Limits of Deleterious Substances and Physical Property Requirements shall be as listed in ASTM C33, Table 3 for severe weathering regions. Size numbers for the concrete mixes shall be as shown in Table 03300-1.

TABLE 03300-1

Description	Maximum Coarse Aggregate Size	Size Number (ASTM C33 Table 2)
24-in thick or greater	1-1/2-in	467
Greater than 12-in thick	1-in	57
12-in thick or less	3/4-in	67
Peastone mix	3/8-in	8

2.3 WATER:

A. Water shall be potable. Water for curing shall not contain any substance injurious to concrete, or which causes staining.

2.4 ADMIXTURES

A. Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures.

1. Air entraining agent shall be in accordance with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
    1) Subject to compliance with requirements, products which may be

incorporated in the work include the following:

- "Sika AER" by Sika Corp.
- "MB-VR or MB-AE" by Master Builders
- "Darex AEA" or "Daravair" by W. R. Grace or approved equal.

2. Water reducing agent shall be a mid-range water reducer meeting ASTM C494, Type A, and contain no more than .05% chloride ions. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
    1) Subject to compliance with requirements, products that may be incorporated in the work include the following:
        - "Plastocrete 161" by Sika Chemical Corp.
        - "Pozzolith Normal" by Master Builders
        - "WRDA" by W. R. Grace or approved equal.
3. Superplasticizer agent shall be in accordance with ASTM C494, Type F or Type G and contain no more than 0.05% chloride ions. Product may be plant added or field added based on the best application considering distance, temperature and time. The treated concrete shall be capable of maintaining plastic state for two hours or longer depending on application. Proportioning and mixing shall be in accordance with manufacturer's recommendations.
    1) Subject to compliance with requirements, products that may be incorporated in the work include the following:
        - "Sikament 300" by Sika Chemical Corp.
        - "Rheobuild" by Master Builders
        - "WRDA 19" or "Duracem" by W. R. Grace or approved equal.

4. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the Engineer. When allowed, the admixtures shall be retarding or accelerating water reducing or high range water reducing admixtures.

5. Prohibited admixtures: Calcium chloride, thiocynanates and admixtures containing more than 0.05% chloride ions are not permitted.

2.5 MIXES

A. Development of mix designs and testing shall be by an independent testing laboratory acceptable to the Engineer engaged by and at the expense of the Contractor.

B. Select properties of ingredients to meet the design strength and materials limits specified in Tables 03300-2 and 03300-3 and to produce concrete having proper placeability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

C. The design mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if not available, be developed by laboratory test. Water content of the concrete shall be based on a curve showing the relation between water cementitious ratio and 7 and 28 day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing a average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the compressive strength specified, without extrapolation. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratios and net minimum cementitious content as specified in Table 03300-3.

TABLE 03300-2

Design Strength*	Minimum Lab Strength at 7 Days
3000 psi	2100 psi
4000 psi	2800 psi

*Specified compressive strength at 28 days

In no case, however, shall the resulting mix conflict with the limiting values for maximum water content and net minimum cement factor specified in Table 03300-3.

D. The limiting strengths, cement factors and water contents for each mix shall be in accordance with Table 03300-3.

TABLE 03300-3

Minimum 28 Day Design Strength	Net Minimum Cement Factor* Content in (100 lbs/cy)	Maximum Water Content** gals/100 lbs of Cement)	Maximum Water-Cementitious Materials Ratio (by weight)
3000	6.11	6.4	0.58
4000	6.3	5.4	0.45
Pumped Concrete	6.3		0.45

* Minimum. Increase as necessary to meet other requirements. These cement factors apply to "controlled" concrete subject to specific inspection.

** Maximum. Decrease if possible. This represents total water in mix at time of mixing, including free water on aggregates and water in admixture solutions.

E. Compression Test: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the compression strength requirements in conformity with the provisions of ACI 318.

F. Entrained air, as measured by ASTM C231, shall be as shown in Table 03300-4.

TABLE 0033-4

Concrete Placement	Total Air Measured at Discharge From Truck (Percent)
Trowel finished slabs	3.5 maximum
All other concrete	4-6

1. If the air entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal required under Paragraph 1.04.

G. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 03300-5. If plasticizer is used, the slump indicated shall be that measured before plasticizer is added. Plasticized concrete shall have a maximum slump of eight inches.

TABLE 03300-5

Portion of Structure	Slump (inches) Recommended	Range
Pavement and slabs on ground	2	1-3
Plain footings, slabs, beams		
Pads, curbs and sludge tank walls	2-3	1-4
Heavy reinforced foundation		
Walls and footings	3-4	2-5
Thin reinforced wall and columns	4	3-5

H. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

2.6 CONCRETE

A. Concrete conforming to the requirements listed below shall be used where indicated on the drawings. Unless otherwise indicated, concrete fill and concrete used as fill under foundations (mud slab), and elsewhere approved by the Engineer, shall be the 3,000 psi mix.

CONCRETE STRENGTHS

Minimum Comp. Strength at 28 days (psi)	Maximum Water/ Cement Ratio Gallons per bag of cement)*	Cement Factor: 94 lb. bags Per cubic yard minimum**
3000	0.59 (6.9)	5.5
4000	0.48 (5.6)	6.5

* Based on air-entrained concrete. If non-air-entrained concrete is called for, the listed maximum water/cement ratios may be increased slightly, as approved by the Engineer. The water is the total water in the mix, including free water on the aggregate.

** These are minimum amounts; increase as necessary to meet mix requirements

.

B. Concrete shall conform to ASTM C94. One copy of the Certificate of Delivery required by ASTM C94 shall be delivered to the Engineer immediately upon arrival of each load of concrete at the site. The Contractor shall be responsible for the design of the concrete mixtures.

C. Standard compression tests in conformity with the provisions of ACI 318 of all proposed mixes shall be made by the testing laboratory or other satisfactory evidence shall be presented that the design mixes will attain the minimum strengths listed on the design drawings or called for herein, within the limitations of the ACI Code. No concrete shall be delivered to the job site until the Engineer has approved the design mixes.

D. All concrete (unless otherwise directed) shall contain an air-entraining agent. Air entrained concrete shall have an air content by volume, measured at discharge from truck, of 3 to 6 percent for l-l/2-inch aggregate and 4 to 8 percent for 3/4-inch aggregate. The air content shall be the responsibility of the testing laboratory and in accordance with ASTM C23l.

E. All concrete shall contain a mid-range water reducer to minimize cement and water content of the mix, at the specified slump, in accordance with ASTM C494.

F. Slump for all concrete shall be from 3-inch to 4-inch, except for concrete using a superplasticizer, when the maximum slump shall be 8 inches. Any concrete having a slump greater than 4 inches (8 inches with superplasticizer) shall be promptly removed from the site.

G. No calcium chloride or admixtures containing calcium chloride shall be added to the concrete. No admixture other than those specified shall be used in concrete without the specific written permission of the Engineer in each case.

H. No additional water, except for the amount indicated by the design mix shall be added to the concrete without the prior permission of the Engineer.

2.7 GROUT:

A. Non-metallic, non-shrink grout shall be pre-mixed, non metallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensation agents, plasticizing and water reducing agents, complying with CRD-C588.

2.8 CURING MATERIALS:

A. Curing compound shall be a curing/hardener compound such as Acurion by AntiHydro, Sikaguard Cure/Hard by Sika, Super Diamond Clear by Euclid or approved equal. Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309 Type 1-D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil.

1. Subject to compliance with requirements, products which may be incorporated in the work, include the following:

a. "Masterseal" by Master Builders
b. "Ecocure" by Euclid Chemical Co.
c. "L&M Cure" by L & M Const. Chemical Co. or approved equal.

2. Curing paper shall be a fiber-reinforced laminated Kraft bituminous product, polyethylene firm or white burlap-polyethylene sheeting, all conforming to the requirements of ASTM Cl7l.

2.9 FLOOR HARDENER

A. Floor hardener shall be a colorless aqueous solution containing zinc silicofluoride, magnesium silicofluoride, or sodium silicofluoride. These silicofluoride can be used individually or in combination. Proprietary hardeners may be used if approved by the contracting officer.

PART 3 - EXECUTION

3.1 GENERAL:

A. Under no circumstances shall concrete which has set or partially set before placing be used; and no retempering of concrete or grout will be permitted.

B. The batching, mixing, transporting, placing and curing of concrete shall be subject to the inspection of the Engineer at all times. The Contractor shall advise the Engineer

of his readiness to proceed at least six working hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing and the alignment, cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the Engineer.

C. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:

1. The gradation of aggregate

2. The proportion of fine and coarse aggregate.

3. The percentage of entrained air, within the allowable limits.

D. Furnish a delivery ticket for ready mixed concrete to the Engineer as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any wage is added and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of transit mix trucks.

3.2 PREPARATION:

A. Before placing concrete, forms and the space to be occupied by the concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint or other material which would tend to reduce the bond.

B. Earth, concrete, masonry, or other water-permeable material against which concrete is to be placed shall be thoroughly saturated with water immediately before concrete is placed. No concrete shall be placed until the consolidation of the ground and the arrangement and details of forms and reinforcing have been inspected and approved by the Engineer.

C. When joining fresh concrete to concrete which has attained full set, the latter shall be cleaned by chipping, roughen to a ¼ inch amplitude, and washing off all dirt, scum and laitance. It then shall be moistened prior to placing new concrete.

3.3 MIXING AND TRANSPORTATION:

A. Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C94, except as otherwise specified. Truck mixers, agitators, and non-agitating units shall comply with National Ready-Mix Concrete Association (NRMCA) and Truck Mixer Manufacturers' Bureau (TMMB). Ready-mix plant equipment and facilities shall be certified in accordance with NMRCA QC 3. Site-mixed concrete shall be mixed in accordance with ACI 301. On-site plant shall conform to the NRMCA CPMB 100.

B. No water from the truck system or elsewhere shall be added after the initial introduction of mixing water for the batch except when on arrival at the jobsite, the slump of the concrete is less than that specified. Water added to bring the slump within the specified range shall not change the total water in the concrete to a point that the approved water-cement ratio is exceeded. The drum shall be turned an additional 30 revolutions, or more, if necessary, until the added water is uniformly mixed into the concrete. Water shall not be added to the batch at any later time.

C. Ready-mix or transit-mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities for the respective conditions as stated on the name plate. Discharge at the site shall be within 1-1/2 hours after cement was first introduced into the mix. Central mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the pre-mixed concrete is placed in the truck and shall continue without interruption until discharge. Transit-mixed concrete shall be mixed at mixing speed for at least 10 minutes immediately after charging the truck, followed by agitation without interruption until discharged.

D. All central plant and rolling stock equipment and methods shall conform to the latest Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready-Mixed Concrete Association, as well as ACI 304 and ASTM C94.

E. Attention is called to the importance of dispatching trucks from the batching plant so that they shall arrive at the site of the work just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

F. Concrete shall be discharged within 1-1/2 hours after introduction of the cement to the aggregates, except that when the concrete temperature exceeds 85 degrees F, this time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after it has been discharged from the truck.

G. Temperature and Mixing Time Control:

   a. In cold weather, maintain the as-mixed temperature of the concrete and concrete temperatures at the time of placement in the forms as indicated in Table 03300-6.

b. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees F.

c. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees F. If necessary, substitute well-crushed ice for all or part of the mixing water.

d. The maximum time interval between the addition of mixing water and/or cement to the batch, and the placing of concrete in the forms shall not exceed the following:

TABLE 03300-6

AIR OR CONCRETE TEMPERATURE (WHICHEVER IS HIGHER)	MAXIMUM TIME
80 degrees F to 90 degrees F	45 minutes
70 degrees F to 79 degrees F	60 minutes
40 degrees F to 69 degrees F	90 minutes

If an approved mid or high range water reducer (plasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes or other appropriate time such that workability and Contractor's ability to properly place the concrete will not be adversely compromised.

3.4 INSTALLATION/APPLICATION/ERECTION:

A. PLACING:

1. Verify that all formwork completely encloses concrete to be poured and is securely braced prior to concrete placement. Remove ice, excess water, dirt and other foreign materials from form. Confirm that reinforcement and other embedded items are securely in place.

2. No concrete shall be placed by pumping methods without the prior written approval of the Engineer. Should the Contractor be allowed to place concrete by pumping methods, procedures, mix design of concrete, and all other precautions shall be in accordance with ACI 304.2R and as approved by the Engineer.

3. Concrete shall be placed in alternate areas, as defined by the construction and control joints indicated on the design drawings. A minimum of 3 days shall elapse between placement of adjacent sections.

4. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing. Should any segregation occur, the concrete shall be remixed before it is placed. Concrete shall be placed in the forms in horizontal layers not over l to 2 feet thick. Concrete shall not be allowed to drop freely more than 4 feet. If the free drop to the point of placement must exceed 4 feet, the Contractor shall obtain the approval of the Engineer for the proposed method of depositing the concrete. The concrete shall not be required to flow over distances greater than 3 feet in any direction in the forms or on the ground, unless otherwise permitted by the Engineer.

5. Do not place concrete for supported elements until concrete previously placed in the supporting element (column, slabs and/or walls) has reached 70% of its 28 day strength.

6. Unless otherwise noted, the work begun on any day shall be completed in daylight of the same day.

7. "Cold Joints" are to be avoided, but if they occur, they are to be treated as bonded construction joints.

8. Chutes for conveying concrete shall be of U-shaped design and sized to insure a continuous flow of concrete. Flat (coal) chutes shall not be employed. Chutes shall be metal or metal-lined, and each section shall have approximately the same slope. The slope shall not be less than 25 nor more than 45 degrees and shall be such as to prevent segregation of the ingredients. The discharge end of the chute shall be provided with a baffle plate or spout to prevent segregation. If the discharge end of the chute is more than 5 feet above the surface of the concrete in the forms, a spout shall be used and the lower end maintained as near the surface of deposit as practicable. When the operation is intermittent, the chute shall discharge into a hopper. Chutes shall be thoroughly cleaned before and after each run, and the debris and any water shall be discharged outside the forms. Concrete shall not be allowed to flow horizontally more than 5 feet.

9. Concrete during and immediately after depositing shall be thoroughly compacted by means of suitable tools. Internal type mechanical vibrators shall be employed to produce the required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be carried on long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents or "pumping" or migration of air. All vibrators shall be supplemented by proper wooden spade puddling adjacent to forms to remove included bubbles and honeycomb. This is essential for the top lifts of walls. All vibrators shall travel at least 10,000 rpm and be of adequate capacity. At least one vibrator shall be used for every 10 cubic yards of concrete per hour. In addition, one spare vibrator in operating condition shall be on the site.

10. Concrete slabs on the ground shall be well-tamped into place and foundation material shall be wet, tamped, and rolled until thoroughly compacted prior to placing concrete.

11. Concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section. If a section cannot be placed continuously, construction joints may be located at points as provided for in the drawings or approved by the Engineer.

12. Chutes, hoppers, spouts, adjacent work, etc., shall be thoroughly cleaned before and after each run, and the water and debris shall not be discharged inside the form.

B. CONCRETE PLACING DURING COLD WEATHER:

1. For this Specification, cold weather is defined as a period when for more than three successive days, the average daily outdoor temperature drops below 40 degrees F. The average daily temperature shall be calculated as the average of the highest and the lowest temperature during the period from midnight to midnight

2. Concrete placed during cold weather shall be batched, delivered, placed, cured and protected to compliance with the recommendations of ACI 306R and the additional requirements of this section.

3. Concrete shall not be placed on frozen ground, and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 40oF, or is expected to fall to below 40 degrees F, within 72 hours, and the concrete after placing shall be protected by covering, heat, or both. No accelerant shall be used to prevent freezing.

4. The temperature of concrete surfaces shall not be permitted to drop below 50 degrees F. for at least 7 days after placement of the concrete.

5. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer. All procedures shall be in accordance with provisions of ACI 306. Cold weather concreting shall not begin until the work plan is acceptable to the Engineer.

C. CONCRETE PLACING DURING HOT WEATHER:

1. For this Specification, hot weather is defined as any combination of high air temperatures, low relative humidity, and wind velocity which produces a rate of evaporation as estimated in ACI 305R, approaching or exceeding 0.2 pounds per square foot per hour.

2. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. The Contractor shall make every effort to minimize delays which will result in excessive mixing of the concrete after arrival on the job.

3. During periods of excessively hot weather (90 degrees F, or above) ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 90 degrees F, when ready for placement will not be acceptable, and will be rejected.

4. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. The record shall include checks on temperature of concrete as delivered and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.

5. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel

6. Temperature will not exceed the ambient air temperature immediately before embedment in concrete.

7. Wet form, particularly metal deck, before placing concrete.

8. Keep permanent temperature record showing date and outside temperature for concreting operations. Thermometer reading shall be taken at start of work in morning, at noon, and again late in afternoon., Locations of concrete placed during such periods shall likewise be recorded, in such manner as to show any effect temperatures may have had on construction. Copies of temperature record shall be distributed daily to Owner.

D. COMPACTING

1. Concrete during and immediately after depositing shall be thoroughly compacted by means of suitable tools. Internal type mechanical vibrators shall be employed to produce the required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be carried on long enough to produce homogeneity and optimum consolidation without permitting segregation of the

solid constituents or "pumping" or migration of air. All vibrators shall be supplemented by proper wooden spade puddling adjacent to forms to remove included bubbles and honeycomb. This is essential for the top lifts of walls. All vibrators shall travel at least 10,000 rpm and be of adequate capacity. At least one vibrator shall be used for every 10 cu. yd. of concrete per hour. In addition, one spare vibrator in operating condition shall be on the site.

2. A minimum frequency of 7000 revolutions per minute is required for mechanical vibrators. Do not use vibrators to transport concrete within forms. Insert vibrators and withdraw at points from 18-in to 30-in apart. At each insertion, vibrate sufficiently to consolidate concrete, generally from five to 15 seconds. Do not over vibrate so as to segregate.

E. CURING:

1. Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the placement prior to placing concrete. No fire or excessive heat shall be permitted near or in direct contact with the concrete at any time. Concrete curing shall be performed as specified in ACI 30l and as stated herein. All curing procedures shall have prior approval of the Engineer.

2. Curing procedure shall be continued for at least 7 days.

   a. Moisture loss from surface placed against metal or wood forms shall be minimized by keeping forms wet until removal.

   b. Curing shall be continued for at least 7 days. When forms are removed during the curing period, surfaces shall be cured by spraying or by the use of a curing compound as previously specified.

   c. Surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary, 1/2-inch thick plywood sheets shall be used to protect the exposed surface.

F. FINISHING OF FORMED SURFACES:

1. Schedule of Finishes:

   a. Concrete for the Project shall be finished in the various specified manners either to remain as natural concrete or to receive an additional applied finish or material under another Section.

b. Finishes to the base concrete for the following conditions shall be finished as noted and as further specified herein:

i. Exposed exterior formed concrete, except exposed slabs and walking surfaces – Rubbed finish.

ii. Concrete to receive chemical hardener – Light broom finish, non slip, except at electrical rooms provide wood float, non slip.

iii. Exterior concrete slab, stairs and other horizontal areas -- Broomed finish, non-slip.

iv. Walls and vertical surfaces in process tanks and basins – Off form finish.

v. Concrete receiving sheet membrane waterproofing – cleared of laitance and foreign materials and rubbed at vertical surfaces, steel trowel finish at horizontal/sloping surfaces.

vi. Concrete to receive paint – Rubbed finish

vii. Top of curbs and pads – Steel troweled finish

2. Concrete shall not be stripped before the concrete has been cured and attained required strength.

3. Care shall be exercised to prevent damaging edges or obliterating the lines of chamfers, rustications or corners when removing the forms or doing any other work adjacent thereto.

4. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to the satisfaction of the Engineer.

5. Off-Form Finish – Fins and other projections shall be removed, dull of and sharpen edges, and tie cones and defects filled.

6. Rubbed Finish

a. Immediately upon stripping forms and before concrete has changed in color, all fins shall be carefully removed with a hammer. While the wall is still damp apply a thin coat of medium consistency neat cement slurry by means of bristle brushes to provide a bonding coat with all pits, air holes or blemishes in the parent concrete; avoid coating large areas of the finished surface with this slurry

b. Before the slurry has dried or changed color, apply a dry (almost crumbly) grout consisting of one volume cement to 1-1/2 volumes of clean masonry sand having a fineness modulus of approximately 2.25 and complying with the gradation requirements of the ASTM for such a material. Grout shall be uniformly applied by means of camp (neither dripping wet nor dry) pads of coarse burlap approximately 6-in square

used as a float. Grout shall be well scrubbed into the pits and air holes to provide a dense mortar in the imperfections to be patched.

c. Allow the mortar to partially harden for one or two hours depending upon the weather. If the air is hot and dry, keep the wall damp during this period using a fine fog spray. When the grout has hardened sufficiently so it can be scraped from the surface with the perpendicular edge of a steel trowel without damaging the grout in the small pits or holes, cut off all that can be removed with a trowel. Grout allowed to remain on the wall to long will get too hard and will be difficult to remove.

d. Allow the surface to dry thoroughly and rub it vigorously with clean dry burlap to completely remove any dried grout. No visible film of grout should remain after this rubbing. The entire cleaning operation for any area must be completed the day it is started. Do not leave grout on surfaces overnight. Allow sufficient time for grout to dry after it has been cut with the trowel so it can be wiped off clean with the burlap.

e. On the day following the repair of pits, air holes and blemishes, the walls again shall be wiped off clean with dry, used pieces of burlap containing old hardened mortar which will act as a mild-abrasive. After this treatment, there shall be no built-up firm remaining on the parent surface. If, however, such is present a fine abrasive stone shall be used to remove all such material without breaking through the surface film of the original concrete. Such scrubbing shall be light and sufficient only to remove excess material without working up a lather or mortar or change the texture of the concrete. Rubbing shall be performed while the surface is wet using a carborundum or cement sand brick, to achieve a smooth uniform, even textured finish. Patched and chipped areas shall be blended to match as closely as possible the appearance of the rest of the surface. No cement wash or plastering will be permitted, and no mortar shall be used except as required above.

f. A thorough wash-down with stiff bristle brushes shall follow the final bagging or stoning operation in order that no extraneous materials remain on the surface of the wall. The wall shall be sprayed with a fine fog spray periodically to maintain a continually damp condition for at least 3 days after the application of the repair grout.

g. In addition to scraping, interior concrete surfaces which will be exposed to view and concrete surfaces which are to be prepared and painted as specified in Section 09900, PAINTING, shall receive a smooth rubbed finish, in accordance with ACI 301 and as described below.

h. Form tie holes and other voids and faults shall be patched. Voids shall be cleaned out, roughened, thoroughly wetted, coated with neat cement

paste, and filled with mortar of cement and sand in the same proportions, materials, and color as used in the concrete. The surface of the patch shall be flush with the surrounding surface after finishing operations are complete. Surface shall be kept continuously damp until patches are firm enough to be rubbed without damage.

G. TESTING:

1. Concrete inspection and testing shall be performed by an independent inspection laboratory, engaged and paid for by the Contractor. The Engineer shall approve the inspection laboratory before concrete work commences. Testing equipment shall be supplied by the laboratory, and the preparation of samples and all testing shall be performed by the laboratory personnel. Full assistance and cooperation, concrete for samples, and such auxiliary personnel and equipment as needed shall be provided by the Contractor.

2. At least one slump test shall be performed from each truck load of concrete. The sample for slump shall be taken from the middle third of a truck load. Air content tests shall be made at the discretion of the Engineer. If the measured slump or air content falls outside the specified limits, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed the requirements of the specification and shall be immediately removed from the jobsite to be discarded.

3. The Contractor shall advise the Engineer of his readiness to proceed with concrete placement at least one working day prior to each placement. The Engineer will inspect the preparations for concrete, including the preparation of previously placed concrete, the reinforcing, and the alignment and tightness of formwork. No placement shall be made without the prior approval of the Engineer.

4. A minimum of four standard compression test cylinders shall be made and tested for each 100 cubic yards or fraction thereof for each type and design strength of concrete from each day's placement of concrete. One cylinder shall be tested at 7 days and two cylinders at 28 days. The fourth cylinder from each set shall be kept until the 28 day test report on the second and third cylinders in the same set has been received. The Engineer reserves the right to require test cylinders to be made for each truckload of concrete if the nature of the project or project experience indicates such additional tests are required for proper control of concrete quality.

5. The strength level shall be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified strength f'c, and no individual strength test (average of two cylinders) result falls below the specified strength f'c by more than 500 psi.

6. In the event the average compressive strength of the two 28 day cylinders does not achieve the required level, the Engineer may elect to test the fourth cylinder immediately or test it after 56 days.

H. FAILURE TO MEET REQUIREMENTS:

1. The Engineer shall have the right to reject concrete represented by low strength tests or to agree to further testing of the concrete. Rejected concrete shall be promptly removed and replaced with concrete conforming to the specification. The decision of the Engineer as to whether substandard concrete is to be accepted or rejected or additional tests shall be conducted shall be final. All direct and indirect costs associated with further curing and testing of the concrete shall be at the Contractor's expense.

2. If the Engineer agrees to consider further curing and/or testing of the concrete before making a final decision, the Contractor shall submit a detailed plan to the Engineer, including proposed criteria for acceptance of the concrete. The plan may include additional curing of the concrete, drilling and testing of cores, load testing of the structure, or a combination.

3. If additional curing is permitted before further inspection and testing, the Contractor shall provide any necessary materials and labor to further cure the suspect concrete.

4. If drilling and testing of cores is permitted, the Contractor shall be responsible for obtaining the cores, including provision of ladders, scaffolding, and such incidental equipment as may be required. If additional curing is permitted, cores shall be drilled after the curing period, and shall be in accordance with ASTM Methods C39 and C42. The Contractor shall repair all core holes to the satisfaction of the Engineer.

5. The burden of proof, including, but not limited to the work of cutting and testing the cores, inspection, evaluation, engineering, repair of the holes, or removal and replacement of the concrete in question, and all associated costs therefore, shall be at the expense of the Contractor.

6. If load testing of the concrete is permitted, and if not otherwise indicated, slabs or beams under load test shall be loaded with their own weights plus a superimposed load of 2 times the design live load. The load shall be applied uniformly over the portion being tested in the approved manner and left in position for 24 hours. The structure shall be considered satisfactory if deflection "D" in feet, at end of 24-hour period, does not exceed the following value:

D equals 0.001 (L x L)/t

in which "L" is span in feet, "t" is depth of slab, or beam in inches. If deflection exceeds "D" in the above formula, the concrete shall be considered faulty unless within 24 hours after removal of the load, the slab, or beam under test recovers at least 75 percent of the observed deflection.

7. If the suspect concrete still fails to meet specification requirements, the Engineer shall have the right to reject the concrete, have it removed and replaced, in accordance with paragraph 5 above, or to require mechanical strengthening of the concrete to satisfy project requirements. The Contractor shall submit a removal and replacement plan for review by the Engineer.

END OF SECTION 03300

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APPENDIX A

STATE WAGE RATES

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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

WILLIAM D MCKINNEY
Director

Awarding Authority: Sudbury Water District

Contract Number: SWD 19-13 **City/Town:** SUDBURY

Description of Work: Installation of 5,250 of 12 inch ductile iron pipe on Codjer Land and Horse Pond Road.

Job Location: Codjer Lane and Horse Pond Road

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$33.25	$11.91	$12.70	$0.00	$57.86
	06/01/2019	$34.25	$11.91	$12.70	$0.00	$58.86
	08/01/2019	$34.25	$12.41	$12.70	$0.00	$59.36
	12/01/2019	$34.25	$12.41	$13.72	$0.00	$60.38
	06/01/2020	$35.15	$12.41	$13.72	$0.00	$61.28
	08/01/2020	$35.15	$12.91	$13.72	$0.00	$61.78
	12/01/2020	$35.15	$12.91	$14.82	$0.00	$62.88
	06/01/2021	$35.95	$12.91	$14.82	$0.00	$63.68
	08/01/2021	$35.95	$13.41	$14.82	$0.00	$64.18
	12/01/2021	$35.95	$13.41	$16.01	$0.00	$65.37
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$33.32	$11.91	$12.70	$0.00	$57.93
	06/01/2019	$34.32	$11.91	$12.70	$0.00	$58.93
	08/01/2019	$34.32	$12.41	$12.70	$0.00	$59.43
	12/01/2019	$34.32	$12.41	$13.72	$0.00	$60.45
	06/01/2020	$35.22	$12.41	$13.72	$0.00	$61.35
	08/01/2020	$35.22	$12.91	$13.72	$0.00	$61.85
	12/01/2020	$35.22	$12.91	$14.82	$0.00	$62.95
	06/01/2021	$36.02	$12.91	$14.82	$0.00	$63.75
	08/01/2021	$36.02	$13.41	$14.82	$0.00	$64.25
	12/01/2021	$36.02	$13.41	$16.01	$0.00	$65.44
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$33.44	$11.91	$12.70	$0.00	$58.05
	06/01/2019	$34.44	$11.91	$12.70	$0.00	$59.05
	08/01/2019	$34.44	$12.41	$12.70	$0.00	$59.55
	12/01/2019	$34.44	$12.41	$13.72	$0.00	$60.57
	06/01/2020	$35.34	$12.41	$13.72	$0.00	$61.47
	08/01/2020	$35.34	$12.91	$13.72	$0.00	$61.97
	12/01/2020	$35.34	$12.91	$14.82	$0.00	$63.07
	06/01/2021	$36.14	$12.91	$14.82	$0.00	$63.87
	08/01/2021	$36.14	$13.41	$14.82	$0.00	$64.37
	12/01/2021	$36.14	$13.41	$16.01	$0.00	$65.56
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2018	$97.80	$9.90	$21.15	$0.00	$128.85
	08/01/2019	$102.78	$9.90	$21.15	$0.00	$133.83
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 2*	12/01/2018	$34.27	$7.85	$14.44	$0.00	$56.56
	06/01/2019	$35.14	$7.85	$14.44	$0.00	$57.43
	12/01/2019	$36.00	$7.85	$14.44	$0.00	$58.29
	06/01/2020	$36.89	$7.85	$14.44	$0.00	$59.18
	12/01/2020	$37.78	$7.85	$14.44	$0.00	$60.07
	06/01/2021	$38.70	$7.85	$14.44	$0.00	$60.99
	12/01/2021	$39.61	$7.85	$14.44	$0.00	$61.90
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	12/01/2018	$37.90	$11.50	$7.10	$0.00	$56.50
	06/01/2019	$38.90	$11.50	$7.10	$0.00	$57.50
	12/01/2019	$39.90	$11.50	$7.10	$0.00	$58.50
	06/01/2020	$40.90	$11.50	$7.10	$0.00	$59.50
	12/01/2020	$41.90	$11.50	$7.10	$0.00	$60.50
ASPHALT RAKER *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.58	$11.50	$15.60	$0.00	$74.68
	06/01/2019	$48.68	$11.50	$15.60	$0.00	$75.78
	12/01/2019	$49.83	$11.50	$15.60	$0.00	$76.93
	06/01/2020	$50.93	$11.50	$15.60	$0.00	$78.03
	12/01/2020	$52.08	$11.50	$15.60	$0.00	$79.18
	06/01/2021	$53.18	$11.50	$15.60	$0.00	$80.28
	12/01/2021	$54.33	$11.50	$15.60	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.58	$11.50	$15.60	$0.00	$74.68
	06/01/2019	$48.68	$11.50	$15.60	$0.00	$75.78
	12/01/2019	$49.83	$11.50	$15.60	$0.00	$76.93
	06/01/2020	$50.93	$11.50	$15.60	$0.00	$78.03
	12/01/2020	$52.08	$11.50	$15.60	$0.00	$79.18
	06/01/2021	$53.18	$11.50	$15.60	$0.00	$80.28
	12/01/2021	$54.33	$11.50	$15.60	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 2*	12/01/2018	$34.27	$7.85	$14.44	$0.00	$56.56
	06/01/2019	$35.14	$7.85	$14.44	$0.00	$57.43
	12/01/2019	$36.00	$7.85	$14.44	$0.00	$58.29
	06/01/2020	$36.89	$7.85	$14.44	$0.00	$59.18
	12/01/2020	$37.78	$7.85	$14.44	$0.00	$60.07
	06/01/2021	$38.70	$7.85	$14.44	$0.00	$60.99
	12/01/2021	$39.61	$7.85	$14.44	$0.00	$61.90
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2019	$44.71	$7.07	$17.72	$0.00	$69.50
	01/01/2020	$46.10	$7.07	$17.98	$0.00	$71.15

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$29.06	$7.07	$11.52	$0.00	$47.65
2	65	$29.06	$7.07	$11.52	$0.00	$47.65
3	70	$31.30	$7.07	$12.40	$0.00	$50.77
4	75	$33.53	$7.07	$13.30	$0.00	$53.90
5	80	$35.77	$7.07	$14.18	$0.00	$57.02
6	85	$38.00	$7.07	$15.07	$0.00	$60.14
7	90	$40.24	$7.07	$15.95	$0.00	$63.26
8	95	$42.47	$7.07	$16.84	$0.00	$66.38

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) *BRICKLAYERS LOCAL 3 (WALTHAM)*	02/01/2019	$53.55	$10.75	$20.66	$0.00	$84.96
	08/01/2019	$54.90	$10.75	$20.80	$0.00	$86.45
	02/01/2020	$55.54	$10.75	$20.80	$0.00	$87.09
	08/01/2020	$56.89	$10.75	$20.95	$0.00	$88.59
	02/01/2021	$57.53	$10.75	$20.95	$0.00	$89.23
	08/01/2021	$58.93	$10.75	$21.11	$0.00	$90.79
	02/01/2022	$59.52	$10.75	$21.11	$0.00	$91.38

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.78	$10.75	$20.66	$0.00	$58.19
2	60	$32.13	$10.75	$20.66	$0.00	$63.54
3	70	$37.49	$10.75	$20.66	$0.00	$68.90
4	80	$42.84	$10.75	$20.66	$0.00	$74.25
5	90	$48.20	$10.75	$20.66	$0.00	$79.61

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.45	$10.75	$20.80	$0.00	$59.00
2	60	$32.94	$10.75	$20.80	$0.00	$64.49
3	70	$38.43	$10.75	$20.80	$0.00	$69.98
4	80	$43.92	$10.75	$20.80	$0.00	$75.47
5	90	$49.41	$10.75	$20.80	$0.00	$80.96

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2018	$39.75	$7.85	$15.55	$0.00	$63.15
	06/01/2019	$40.75	$7.85	$15.55	$0.00	$64.15
	12/01/2019	$41.75	$7.85	$15.55	$0.00	$65.15
	06/01/2020	$42.74	$7.85	$15.55	$0.00	$66.14
	12/01/2020	$43.72	$7.85	$15.55	$0.00	$67.12
	06/01/2021	$44.74	$7.85	$15.55	$0.00	$68.14
	12/01/2021	$45.75	$7.85	$15.55	$0.00	$69.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2018	$38.60	$7.85	$15.55	$0.00	$62.00
	06/01/2019	$39.60	$7.85	$15.55	$0.00	$63.00
	12/01/2019	$40.60	$7.85	$15.55	$0.00	$64.00
	06/01/2020	$41.59	$7.85	$15.55	$0.00	$64.99
	12/01/2020	$42.57	$7.85	$15.55	$0.00	$65.97
	06/01/2021	$43.59	$7.85	$15.55	$0.00	$66.99
	12/01/2021	$44.60	$7.85	$15.55	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2018	$38.60	$7.85	$15.55	$0.00	$62.00
	06/01/2019	$39.60	$7.85	$15.55	$0.00	$63.00
	12/01/2019	$40.60	$7.85	$15.55	$0.00	$64.00
	06/01/2020	$41.59	$7.85	$15.55	$0.00	$64.99
	12/01/2020	$42.57	$7.85	$15.55	$0.00	$65.97
	06/01/2021	$43.59	$7.85	$15.55	$0.00	$66.99
	12/01/2021	$44.60	$7.85	$15.55	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 2 (Eastern Massachusetts)*	09/01/2018	$41.32	$9.90	$17.50	$0.00	$68.72
	03/01/2019	$42.35	$9.90	$17.50	$0.00	$69.75

Apprentice - *CARPENTER - Zone 2 Eastern MA*

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.66	$9.90	$1.73	$0.00	$32.29
2	60	$24.79	$9.90	$1.73	$0.00	$36.42
3	70	$28.92	$9.90	$12.31	$0.00	$51.13
4	75	$30.99	$9.90	$12.31	$0.00	$53.20
5	80	$33.06	$9.90	$14.04	$0.00	$57.00
6	80	$33.06	$9.90	$14.04	$0.00	$57.00
7	90	$37.19	$9.90	$15.77	$0.00	$62.86
8	90	$37.19	$9.90	$15.77	$0.00	$62.86

Effective Date - 03/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.18	$9.90	$1.73	$0.00	$32.81
2	60	$25.41	$9.90	$1.73	$0.00	$37.04
3	70	$29.65	$9.90	$12.31	$0.00	$51.86
4	75	$31.76	$9.90	$12.31	$0.00	$53.97
5	80	$33.88	$9.90	$14.04	$0.00	$57.82
6	80	$33.88	$9.90	$14.04	$0.00	$57.82
7	90	$38.12	$9.90	$15.77	$0.00	$63.79
8	90	$38.12	$9.90	$15.77	$0.00	$63.79

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80

Step 1&2 $30.22/ 3&4 $36.03/ 5&6 $52.86/ 7&8 $58.73

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER WOOD FRAME *CARPENTERS -ZONE 2 (Wood Frame)*	10/01/2018	$27.09	$7.07	$7.86	$0.00	$42.02
	04/01/2019	$27.52	$7.07	$7.86	$0.00	$42.45
	10/01/2019	$27.95	$7.07	$7.86	$0.00	$42.88

All Aspects of New Wood Frame Work - As of 9/1/09 Carpentry work on wood-frame WEATHERIZATION projects shall be paid the WOOD FRAME CARPENTER rate.

Apprentice - *CARPENTER (Wood Frame) - Zone 2*

Effective Date - 10/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$16.25	$7.07	$0.00	$0.00	$23.32
2	60	$16.25	$7.07	$0.00	$0.00	$23.32
3	65	$17.61	$7.07	$7.86	$0.00	$32.54
4	70	$18.96	$7.07	$7.86	$0.00	$33.89
5	75	$20.32	$7.07	$7.86	$0.00	$35.25
6	80	$21.67	$7.07	$7.86	$0.00	$36.60
7	85	$23.03	$7.07	$7.86	$0.00	$37.96
8	90	$24.38	$7.07	$7.86	$0.00	$39.31

Effective Date - 04/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$16.51	$7.07	$0.00	$0.00	$23.58
2	60	$16.51	$7.07	$0.00	$0.00	$23.58
3	65	$17.89	$7.07	$7.86	$0.00	$32.82
4	70	$19.26	$7.07	$7.86	$0.00	$34.19
5	75	$20.64	$7.07	$7.86	$0.00	$35.57
6	80	$22.02	$7.07	$7.86	$0.00	$36.95
7	85	$23.39	$7.07	$7.86	$0.00	$38.32
8	90	$24.77	$7.07	$7.86	$0.00	$39.70

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80

Step 1&2 $19.26/ 3&4 $26.72/ 5&6 $33.89/ 7&8 $36.60

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (WALTHAM)*	01/01/2019	$47.50	$12.50	$22.41	$0.30	$82.71
	07/01/2019	$48.24	$12.50	$22.41	$0.30	$83.45
	01/01/2020	$49.64	$12.50	$22.41	$0.30	$84.85

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.75	$12.50	$15.41	$0.00	$51.66
2	60	$28.50	$12.50	$17.41	$0.30	$58.71
3	65	$30.88	$12.50	$18.41	$0.30	$62.09
4	70	$33.25	$12.50	$19.41	$0.30	$65.46
5	75	$35.63	$12.50	$20.41	$0.30	$68.84
6	80	$38.00	$12.50	$21.41	$0.30	$72.21
7	90	$42.75	$12.50	$22.41	$0.30	$77.96

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.12	$12.50	$15.41	$0.00	$52.03
2	60	$28.94	$12.50	$17.41	$0.30	$59.15
3	65	$31.36	$12.50	$18.41	$0.30	$62.57
4	70	$33.77	$12.50	$19.41	$0.30	$65.98
5	75	$36.18	$12.50	$20.41	$0.30	$69.39
6	80	$38.59	$12.50	$21.41	$0.30	$72.80
7	90	$43.42	$12.50	$22.41	$0.30	$78.63

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

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$48.58	$11.50	$15.60	$0.00	$75.68
	06/01/2019	$49.68	$11.50	$15.60	$0.00	$76.78
	12/01/2019	$50.83	$11.50	$15.60	$0.00	$77.93
	06/01/2020	$51.93	$11.50	$15.60	$0.00	$79.03
	12/01/2020	$53.08	$11.50	$15.60	$0.00	$80.18
	06/01/2021	$54.18	$11.50	$15.60	$0.00	$81.28
	12/01/2021	$55.33	$11.50	$15.60	$0.00	$82.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$32.03	$11.50	$15.60	$0.00	$59.13
	06/01/2019	$32.78	$11.50	$15.60	$0.00	$59.88
	12/01/2019	$33.57	$11.50	$15.60	$0.00	$60.67
	06/01/2020	$34.32	$11.50	$15.60	$0.00	$61.42
	12/01/2020	$35.10	$11.50	$15.60	$0.00	$62.20
	06/01/2021	$35.85	$11.50	$15.60	$0.00	$62.95
	12/01/2021	$36.64	$11.50	$15.60	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2019	$50.36	$8.15	$20.85	$0.00	$79.36
	07/01/2019	$51.46	$8.15	$20.85	$0.00	$80.46
	01/01/2020	$52.56	$8.15	$20.85	$0.00	$81.56
	07/01/2020	$53.66	$8.15	$20.85	$0.00	$82.66
	01/01/2021	$54.76	$8.15	$20.85	$0.00	$83.76

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.18	$8.15	$0.00	$0.00	$33.33
2	55	$27.70	$8.15	$5.64	$0.00	$41.49
3	60	$30.22	$8.15	$6.15	$0.00	$44.52
4	65	$32.73	$8.15	$6.66	$0.00	$47.54
5	70	$35.25	$8.15	$17.78	$0.00	$61.18
6	75	$37.77	$8.15	$18.29	$0.00	$64.21
7	80	$40.29	$8.15	$18.80	$0.00	$67.24
8	90	$45.32	$8.15	$19.83	$0.00	$73.30

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.73	$8.15	$0.00	$0.00	$33.88
2	55	$28.30	$8.15	$5.64	$0.00	$42.09
3	60	$30.88	$8.15	$6.15	$0.00	$45.18
4	65	$33.45	$8.15	$6.66	$0.00	$48.26
5	70	$36.02	$8.15	$17.78	$0.00	$61.95
6	75	$38.60	$8.15	$18.29	$0.00	$65.04
7	80	$41.17	$8.15	$18.80	$0.00	$68.12
8	90	$46.31	$8.15	$19.83	$0.00	$74.29

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 2*	12/01/2018	$38.80	$7.85	$15.35	$0.00	$62.00
	06/01/2019	$39.80	$7.85	$15.35	$0.00	$63.00
	12/01/2019	$40.80	$7.85	$15.35	$0.00	$64.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2018	$39.80	$7.85	$15.35	$0.00	$63.00
	06/01/2019	$40.80	$7.85	$15.35	$0.00	$64.00
	12/01/2019	$41.80	$7.85	$15.35	$0.00	$65.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS *LABORERS - ZONE 2*	12/01/2018	$39.55	$7.85	$15.35	$0.00	$62.75
	06/01/2019	$40.55	$7.85	$15.35	$0.00	$63.75
	12/01/2019	$41.55	$7.85	$15.35	$0.00	$64.75
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 2*	12/01/2018	$39.80	$7.85	$15.35	$0.00	$63.00
	06/01/2019	$40.80	$7.85	$15.35	$0.00	$64.00
	12/01/2019	$41.80	$7.85	$15.35	$0.00	$65.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2018	$39.55	$7.85	$15.35	$0.00	$62.75
	06/01/2019	$40.55	$7.85	$15.35	$0.00	$63.75
	12/01/2019	$41.55	$7.85	$15.35	$0.00	$64.75
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 2*	12/01/2018	$38.80	$7.85	$15.35	$0.00	$62.00
	06/01/2019	$39.80	$7.85	$15.35	$0.00	$63.00
	12/01/2019	$40.80	$7.85	$15.35	$0.00	$64.00
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2018	$65.20	$9.90	$21.15	$0.00	$96.25
	08/01/2019	$68.52	$9.90	$21.15	$0.00	$99.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2018	$46.57	$9.90	$21.15	$0.00	$77.62
	08/01/2019	$48.94	$9.90	$21.15	$0.00	$79.99
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2018	$69.86	$9.90	$21.15	$0.00	$100.91
	08/01/2019	$73.41	$9.90	$21.15	$0.00	$104.46
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2018	$97.80	$9.90	$21.15	$0.00	$128.85
	08/01/2019	$102.78	$9.90	$21.15	$0.00	$133.83
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) *ELECTRICIANS LOCAL 103*	09/01/2018	$50.62	$13.00	$18.37	$0.00	$81.99
	03/01/2019	$51.10	$13.00	$18.88	$0.00	$82.98
For apprentice rates see "Apprentice- ELECTRICIAN"						
ELECTRICIAN *ELECTRICIANS LOCAL 103*	09/01/2018	$50.62	$13.00	$18.37	$0.00	$81.99
	03/01/2019	$51.10	$13.00	$18.88	$0.00	$82.98

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.25	$13.00	$0.61	$0.00	$33.86
2	40	$20.25	$13.00	$0.61	$0.00	$33.86
3	45	$22.78	$13.00	$13.97	$0.00	$49.75
4	45	$22.78	$13.00	$13.97	$0.00	$49.75
5	50	$25.31	$13.00	$14.38	$0.00	$52.69
6	55	$27.84	$13.00	$14.78	$0.00	$55.62
7	60	$30.37	$13.00	$15.17	$0.00	$58.54
8	65	$32.90	$13.00	$15.58	$0.00	$61.48
9	70	$35.43	$13.00	$15.97	$0.00	$64.40
10	75	$37.97	$13.00	$16.37	$0.00	$67.34

Effective Date - 03/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.44	$13.00	$0.61	$0.00	$34.05
2	40	$20.44	$13.00	$0.61	$0.00	$34.05
3	45	$23.00	$13.00	$14.34	$0.00	$50.34
4	45	$23.00	$13.00	$14.34	$0.00	$50.34
5	50	$25.55	$13.00	$14.76	$0.00	$53.31
6	55	$28.11	$13.00	$15.17	$0.00	$56.28
7	60	$30.66	$13.00	$15.58	$0.00	$59.24
8	65	$33.22	$13.00	$16.00	$0.00	$62.22
9	70	$35.77	$13.00	$16.40	$0.00	$65.17
10	75	$38.33	$13.00	$16.82	$0.00	$68.15

Notes: :

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

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2019	$59.47	$15.58	$17.51	$0.00	$92.56
	01/01/2020	$61.42	$15.73	$18.41	$0.00	$95.56
	01/01/2021	$63.47	$15.88	$19.31	$0.00	$98.66
	01/01/2022	$65.62	$16.03	$20.21	$0.00	$101.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$29.74	$15.58	$0.00	$0.00	$45.32
2	55	$32.71	$15.58	$17.51	$0.00	$65.80
3	65	$38.66	$15.58	$17.51	$0.00	$71.75
4	70	$41.63	$15.58	$17.51	$0.00	$74.72
5	80	$47.58	$15.58	$17.51	$0.00	$80.67

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$30.71	$15.73	$0.00	$0.00	$46.44
2	55	$33.78	$15.73	$18.41	$0.00	$67.92
3	65	$39.92	$15.73	$18.41	$0.00	$74.06
4	70	$42.99	$15.73	$18.41	$0.00	$77.13
5	80	$49.14	$15.73	$18.41	$0.00	$83.28

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

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2019	$41.63	$15.58	$17.51	$0.00	$74.72
	01/01/2020	$42.99	$15.73	$18.41	$0.00	$77.13
	01/01/2021	$44.43	$15.88	$19.31	$0.00	$79.62
	01/01/2022	$45.93	$16.03	$20.21	$0.00	$82.17
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2018	$43.19	$11.00	$15.50	$0.00	$69.69
	05/01/2019	$44.33	$11.00	$15.50	$0.00	$70.83
	11/01/2019	$45.33	$11.00	$15.50	$0.00	$71.83
	05/01/2020	$46.48	$11.00	$15.50	$0.00	$72.98
	11/01/2020	$47.48	$11.00	$15.50	$0.00	$73.98
	05/01/2021	$48.68	$11.00	$15.50	$0.00	$75.18
	11/01/2021	$49.63	$11.00	$15.50	$0.00	$76.13
	05/01/2022	$50.78	$11.00	$15.50	$0.00	$77.28
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2018	$44.67	$11.00	$15.50	$0.00	$71.17
	05/01/2019	$45.82	$11.00	$15.50	$0.00	$72.32
	11/01/2019	$46.83	$11.00	$15.50	$0.00	$73.33
	05/01/2020	$47.98	$11.00	$15.50	$0.00	$74.48
	11/01/2020	$48.99	$11.00	$15.50	$0.00	$75.49
	05/01/2021	$50.15	$11.00	$15.50	$0.00	$76.65
	11/01/2021	$51.16	$11.00	$15.50	$0.00	$77.66
	05/01/2022	$52.32	$11.00	$15.50	$0.00	$78.82
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2018	$22.45	$11.00	$15.50	$0.00	$48.95
	05/01/2019	$23.13	$11.00	$15.50	$0.00	$49.63
	11/01/2019	$23.72	$11.00	$15.50	$0.00	$50.22
	05/01/2020	$24.39	$11.00	$15.50	$0.00	$50.89
	11/01/2020	$24.98	$11.00	$15.50	$0.00	$51.48
	05/01/2021	$25.66	$11.00	$15.50	$0.00	$52.16
	11/01/2021	$26.26	$11.00	$15.50	$0.00	$52.76
	05/01/2022	$26.93	$11.00	$15.50	$0.00	$53.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	09/01/2018	$50.62	$13.00	$18.37	$0.00	$81.99
	03/01/2019	$51.10	$13.00	$18.88	$0.00	$82.98
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING*ELECTRICIANS* *LOCAL 103*	09/01/2018	$37.97	$13.00	$16.35	$0.00	$67.32
	03/01/2019	$38.33	$13.00	$16.82	$0.00	$68.15
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$39.13	$11.50	$15.60	$0.00	$66.23
	06/01/2019	$40.04	$11.50	$15.60	$0.00	$67.14
	12/01/2019	$40.99	$11.50	$15.60	$0.00	$68.09
	06/01/2020	$41.90	$11.50	$15.60	$0.00	$69.00
	12/01/2020	$42.85	$11.50	$15.60	$0.00	$69.95
	06/01/2021	$43.76	$11.50	$15.60	$0.00	$70.86
	12/01/2021	$44.71	$11.50	$15.60	$0.00	$71.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER *LABORERS - ZONE 2*	12/01/2018	$22.50	$7.85	$14.44	$0.00	$44.79
	06/01/2019	$22.50	$7.85	$14.44	$0.00	$44.79
	12/01/2019	$23.50	$7.85	$14.44	$0.00	$45.79
	06/01/2020	$23.50	$7.85	$14.44	$0.00	$45.79
	12/01/2020	$24.50	$7.85	$14.44	$0.00	$46.79
	06/01/2021	$24.50	$7.85	$14.44	$0.00	$46.79
	12/01/2021	$24.50	$7.85	$14.44	$0.00	$46.79
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE I*	03/01/2016	$42.13	$9.80	$17.62	$0.00	$69.55

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 03/01/2016

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

Notes: Steps are 750 hrs.
% After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 $30.55/ 3&4 $36.49/ 5&6 $53.33/ 7&8 $59.33

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.58	$11.50	$15.60	$0.00	$74.68
	06/01/2019	$48.68	$11.50	$15.60	$0.00	$75.78
	12/01/2019	$49.83	$11.50	$15.60	$0.00	$76.93
	06/01/2020	$50.93	$11.50	$15.60	$0.00	$78.03
	12/01/2020	$52.08	$11.50	$15.60	$0.00	$79.18
	06/01/2021	$53.18	$11.50	$15.60	$0.00	$80.28
	12/01/2021	$54.33	$11.50	$15.60	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$32.03	$11.50	$15.60	$0.00	$59.13
	06/01/2019	$32.78	$11.50	$15.60	$0.00	$59.88
	12/01/2019	$33.57	$11.50	$15.60	$0.00	$60.67
	06/01/2020	$34.32	$11.50	$15.60	$0.00	$61.42
	12/01/2020	$35.10	$11.50	$15.60	$0.00	$62.20
	06/01/2021	$35.85	$11.50	$15.60	$0.00	$62.95
	12/01/2021	$36.64	$11.50	$15.60	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 2)*	01/01/2019	$39.86	$8.15	$20.85	$0.00	$68.86
	07/01/2019	$40.96	$8.15	$20.85	$0.00	$69.96
	01/01/2020	$42.06	$8.15	$20.85	$0.00	$71.06
	07/01/2020	$43.16	$8.15	$20.85	$0.00	$72.16
	01/01/2021	$44.26	$8.15	$20.85	$0.00	$73.26

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 35 Zone 2*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.93	$8.15	$0.00	$0.00	$28.08
2	55	$21.92	$8.15	$5.64	$0.00	$35.71
3	60	$23.92	$8.15	$6.15	$0.00	$38.22
4	65	$25.91	$8.15	$6.66	$0.00	$40.72
5	70	$27.90	$8.15	$17.78	$0.00	$53.83
6	75	$29.90	$8.15	$18.29	$0.00	$56.34
7	80	$31.89	$8.15	$18.80	$0.00	$58.84
8	90	$35.87	$8.15	$19.83	$0.00	$63.85

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.48	$8.15	$0.00	$0.00	$28.63
2	55	$22.53	$8.15	$5.64	$0.00	$36.32
3	60	$24.58	$8.15	$6.15	$0.00	$38.88
4	65	$26.62	$8.15	$6.66	$0.00	$41.43
5	70	$28.67	$8.15	$17.78	$0.00	$54.60
6	75	$30.72	$8.15	$18.29	$0.00	$57.16
7	80	$32.77	$8.15	$18.80	$0.00	$59.72
8	90	$36.86	$8.15	$19.83	$0.00	$64.84

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.58	$11.50	$15.60	$0.00	$74.68
	06/01/2019	$48.68	$11.50	$15.60	$0.00	$75.78
	12/01/2019	$49.83	$11.50	$15.60	$0.00	$76.93
	06/01/2020	$50.93	$11.50	$15.60	$0.00	$78.03
	12/01/2020	$52.08	$11.50	$15.60	$0.00	$79.18
	06/01/2021	$53.18	$11.50	$15.60	$0.00	$80.28
	12/01/2021	$54.33	$11.50	$15.60	$0.00	$81.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 12/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$26.17	$11.50	$0.00	$0.00	$37.67
2	60	$28.55	$11.50	$15.60	$0.00	$55.65
3	65	$30.93	$11.50	$15.60	$0.00	$58.03
4	70	$33.31	$11.50	$15.60	$0.00	$60.41
5	75	$35.69	$11.50	$15.60	$0.00	$62.79
6	80	$38.06	$11.50	$15.60	$0.00	$65.16
7	85	$40.44	$11.50	$15.60	$0.00	$67.54
8	90	$42.82	$11.50	$15.60	$0.00	$69.92

Effective Date - 06/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$26.77	$11.50	$0.00	$0.00	$38.27
2	60	$29.21	$11.50	$15.60	$0.00	$56.31
3	65	$31.64	$11.50	$15.60	$0.00	$58.74
4	70	$34.08	$11.50	$15.60	$0.00	$61.18
5	75	$36.51	$11.50	$15.60	$0.00	$63.61
6	80	$38.94	$11.50	$15.60	$0.00	$66.04
7	85	$41.38	$11.50	$15.60	$0.00	$68.48
8	90	$43.81	$11.50	$15.60	$0.00	$70.91

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2018	$44.11	$12.20	$24.12	$2.41	$82.84
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	09/01/2018	$50.62	$13.00	$18.37	$0.00	$81.99
	03/01/2019	$51.10	$13.00	$18.88	$0.00	$82.98
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2018	$44.11	$12.20	$24.12	$2.41	$82.84
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	09/01/2018	$52.94	$9.95	$18.74	$0.00	$81.63
	09/01/2019	$54.44	$9.95	$18.74	$0.00	$83.13
	09/01/2020	$55.94	$9.95	$18.74	$0.00	$84.63
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	09/01/2018	$52.94	$9.95	$18.74	$0.00	$81.63
	09/01/2019	$54.44	$9.95	$18.74	$0.00	$83.13
	09/01/2020	$55.94	$9.95	$18.74	$0.00	$84.63
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HYDRAULIC DRILLS *LABORERS - ZONE 2*	12/01/2018	$34.27	$7.85	$14.44	$0.00	$56.56
	06/01/2019	$35.14	$7.85	$14.44	$0.00	$57.43
	12/01/2019	$36.00	$7.85	$14.44	$0.00	$58.29
	06/01/2020	$36.89	$7.85	$14.44	$0.00	$59.18
	12/01/2020	$37.78	$7.85	$14.44	$0.00	$60.07
	06/01/2021	$38.70	$7.85	$14.44	$0.00	$60.99
	12/01/2021	$39.61	$7.85	$14.44	$0.00	$61.90
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2018	$49.34	$11.75	$14.20	$0.00	$75.29
	09/01/2019	$51.84	$11.75	$14.20	$0.00	$77.79

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

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.67	$11.75	$10.45	$0.00	$46.87
2	60	$29.60	$11.75	$11.20	$0.00	$52.55
3	70	$34.54	$11.75	$11.95	$0.00	$58.24
4	80	$39.47	$11.75	$12.70	$0.00	$63.92

Effective Date - 09/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.92	$11.75	$10.45	$0.00	$48.12
2	60	$31.10	$11.75	$11.20	$0.00	$54.05
3	70	$36.29	$11.75	$11.95	$0.00	$59.99
4	80	$41.47	$11.75	$12.70	$0.00	$65.92

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (BOSTON AREA)*	09/16/2018	$46.07	$8.00	$22.85	$0.00	$76.92

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Boston*

Effective Date - 09/16/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$27.64	$8.00	$22.85	$0.00	$58.49
2	70	$32.25	$8.00	$22.85	$0.00	$63.10
3	75	$34.55	$8.00	$22.85	$0.00	$65.40
4	80	$36.86	$8.00	$22.85	$0.00	$67.71
5	85	$39.16	$8.00	$22.85	$0.00	$70.01
6	90	$41.46	$8.00	$22.85	$0.00	$72.31

Notes:

** Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 2*	12/01/2018	$33.52	$7.85	$14.44	$0.00	$55.81
	06/01/2019	$34.39	$7.85	$14.44	$0.00	$56.68
	12/01/2019	$35.25	$7.85	$14.44	$0.00	$57.54
	06/01/2020	$36.14	$7.85	$14.44	$0.00	$58.43
	12/01/2020	$37.03	$7.85	$14.44	$0.00	$59.32
	06/01/2021	$37.95	$7.85	$14.44	$0.00	$60.24
	12/01/2021	$38.86	$7.85	$14.44	$0.00	$61.15

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 2*

Effective Date - 12/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.11	$7.85	$14.44	$0.00	$42.40
2	70	$23.46	$7.85	$14.44	$0.00	$45.75
3	80	$26.82	$7.85	$14.44	$0.00	$49.11
4	90	$30.17	$7.85	$14.44	$0.00	$52.46

Effective Date - 06/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.63	$7.85	$14.44	$0.00	$42.92
2	70	$24.07	$7.85	$14.44	$0.00	$46.36
3	80	$27.51	$7.85	$14.44	$0.00	$49.80
4	90	$30.95	$7.85	$14.44	$0.00	$53.24

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 2*	12/01/2018	$33.52	$7.85	$14.44	$0.00	$55.81
	06/01/2019	$34.39	$7.85	$14.44	$0.00	$56.68
	12/01/2019	$35.25	$7.85	$14.44	$0.00	$57.54
	06/01/2020	$36.14	$7.85	$14.44	$0.00	$58.43
	12/01/2020	$37.03	$7.85	$14.44	$0.00	$59.32
	06/01/2021	$37.95	$7.85	$14.44	$0.00	$60.24
	12/01/2021	$38.86	$7.85	$14.44	$0.00	$61.15
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 2*	12/01/2018	$33.52	$7.85	$14.44	$0.00	$55.81
	06/01/2019	$34.39	$7.85	$14.44	$0.00	$56.68
	12/01/2019	$35.25	$7.85	$14.44	$0.00	$57.54
	06/01/2020	$36.14	$7.85	$14.44	$0.00	$58.43
	12/01/2020	$37.03	$7.85	$14.44	$0.00	$59.32
	06/01/2021	$37.95	$7.85	$14.44	$0.00	$60.24
	12/01/2021	$38.86	$7.85	$14.44	$0.00	$61.15
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 2*	12/01/2018	$33.72	$7.85	$14.39	$0.00	$55.96
	06/01/2019	$34.59	$7.85	$14.39	$0.00	$56.83
	12/01/2019	$35.45	$7.85	$14.39	$0.00	$57.69
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MASON TENDER *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 2*	12/01/2018	$33.52	$7.85	$14.44	$0.00	$55.81
	06/01/2019	$34.39	$7.85	$14.44	$0.00	$56.68
	12/01/2019	$35.25	$7.85	$14.44	$0.00	$57.54
	06/01/2020	$36.14	$7.85	$14.44	$0.00	$58.43
	12/01/2020	$37.03	$7.85	$14.44	$0.00	$59.32
	06/01/2021	$37.95	$7.85	$14.44	$0.00	$60.24
	12/01/2021	$38.86	$7.85	$14.44	$0.00	$61.15
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 2*	12/01/2018	$33.52	$7.85	$14.44	$0.00	$55.81
	06/01/2019	$34.39	$7.85	$14.44	$0.00	$56.68
	12/01/2019	$35.25	$7.85	$14.44	$0.00	$57.54
	06/01/2020	$36.14	$7.85	$14.44	$0.00	$58.43
	12/01/2020	$37.03	$7.85	$14.44	$0.00	$59.32
	06/01/2021	$37.95	$7.85	$14.44	$0.00	$60.24
	12/01/2021	$38.86	$7.85	$14.44	$0.00	$61.15
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2019	$40.91	$10.75	$18.97	$0.00	$70.63
	08/01/2019	$41.99	$10.75	$19.11	$0.00	$71.85
	02/01/2020	$42.50	$10.75	$19.11	$0.00	$72.36
	08/01/2020	$43.58	$10.75	$19.26	$0.00	$73.59
	02/01/2021	$44.09	$10.75	$19.26	$0.00	$74.10
	08/01/2021	$45.21	$10.75	$19.42	$0.00	$75.38
	02/01/2022	$45.68	$10.75	$19.42	$0.00	$75.85

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.46	$10.75	$18.97	$0.00	$50.18
2	60	$24.55	$10.75	$18.97	$0.00	$54.27
3	70	$28.64	$10.75	$18.97	$0.00	$58.36
4	80	$32.73	$10.75	$18.97	$0.00	$62.45
5	90	$36.82	$10.75	$18.97	$0.00	$66.54

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.00	$10.75	$19.11	$0.00	$50.86
2	60	$25.19	$10.75	$19.11	$0.00	$55.05
3	70	$29.39	$10.75	$19.11	$0.00	$59.25
4	80	$33.59	$10.75	$19.11	$0.00	$63.45
5	90	$37.79	$10.75	$19.11	$0.00	$67.65

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2019	$53.57	$10.75	$20.66	$0.00	$84.98
	08/01/2019	$54.92	$10.75	$20.80	$0.00	$86.47
	02/01/2020	$55.55	$10.75	$20.80	$0.00	$87.10
	08/01/2020	$56.90	$10.75	$20.95	$0.00	$88.60
	02/01/2021	$57.54	$10.75	$20.95	$0.00	$89.24
	08/01/2021	$58.94	$10.75	$21.11	$0.00	$90.80
	02/01/2022	$59.51	$10.75	$21.11	$0.00	$91.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.79	$10.75	$20.66	$0.00	$58.20
2	60	$32.14	$10.75	$20.66	$0.00	$63.55
3	70	$37.50	$10.75	$20.66	$0.00	$68.91
4	80	$42.86	$10.75	$20.66	$0.00	$74.27
5	90	$48.21	$10.75	$20.66	$0.00	$79.62

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.46	$10.75	$20.80	$0.00	$59.01
2	60	$32.95	$10.75	$20.80	$0.00	$64.50
3	70	$38.44	$10.75	$20.80	$0.00	$69.99
4	80	$43.94	$10.75	$20.80	$0.00	$75.49
5	90	$49.43	$10.75	$20.80	$0.00	$80.98

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2) *MILLWRIGHTS LOCAL 1121 - Zone 2*	10/01/2018	$38.02	$9.90	$18.50	$0.00	$66.42
	04/01/2019	$38.87	$9.90	$18.50	$0.00	$67.27

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 2*

Effective Date - 10/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$20.91	$9.90	$5.31	$0.00	$36.12
2	65	$24.71	$9.90	$15.13	$0.00	$49.74
3	75	$28.52	$9.90	$16.10	$0.00	$54.52
4	85	$32.32	$9.90	$17.06	$0.00	$59.28

Effective Date - 04/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$21.38	$9.90	$5.31	$0.00	$36.59
2	65	$25.27	$9.90	$15.13	$0.00	$50.30
3	75	$29.15	$9.90	$16.10	$0.00	$55.15
4	85	$33.04	$9.90	$17.06	$0.00	$60.00

Notes:

Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$23.06	$11.50	$15.60	$0.00	$50.16
	06/01/2019	$23.61	$11.50	$15.60	$0.00	$50.71
	12/01/2019	$24.18	$11.50	$15.60	$0.00	$51.28
	06/01/2020	$24.73	$11.50	$15.60	$0.00	$51.83
	12/01/2020	$25.30	$11.50	$15.60	$0.00	$52.40
	06/01/2021	$25.85	$11.50	$15.60	$0.00	$52.95
	12/01/2021	$26.43	$11.50	$15.60	$0.00	$53.53
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$27.42	$11.50	$15.60	$0.00	$54.52
	06/01/2019	$28.07	$11.50	$15.60	$0.00	$55.17
	12/01/2019	$28.74	$11.50	$15.60	$0.00	$55.84
	06/01/2020	$29.39	$11.50	$15.60	$0.00	$56.49
	12/01/2020	$30.07	$11.50	$15.60	$0.00	$57.17
	06/01/2021	$30.71	$11.50	$15.60	$0.00	$57.81
	12/01/2021	$31.39	$11.50	$15.60	$0.00	$58.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2019	$50.36	$8.15	$20.85	$0.00	$79.36
	07/01/2019	$51.46	$8.15	$20.85	$0.00	$80.46
	01/01/2020	$52.56	$8.15	$20.85	$0.00	$81.56
	07/01/2020	$53.66	$8.15	$20.85	$0.00	$82.66
	01/01/2021	$54.76	$8.15	$20.85	$0.00	$83.76

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.18	$8.15	$0.00	$0.00	$33.33
2	55	$27.70	$8.15	$5.64	$0.00	$41.49
3	60	$30.22	$8.15	$6.15	$0.00	$44.52
4	65	$32.73	$8.15	$6.66	$0.00	$47.54
5	70	$35.25	$8.15	$17.78	$0.00	$61.18
6	75	$37.77	$8.15	$18.29	$0.00	$64.21
7	80	$40.29	$8.15	$18.80	$0.00	$67.24
8	90	$45.32	$8.15	$19.83	$0.00	$73.30

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.73	$8.15	$0.00	$0.00	$33.88
2	55	$28.30	$8.15	$5.64	$0.00	$42.09
3	60	$30.88	$8.15	$6.15	$0.00	$45.18
4	65	$33.45	$8.15	$6.66	$0.00	$48.26
5	70	$36.02	$8.15	$17.78	$0.00	$61.95
6	75	$38.60	$8.15	$18.29	$0.00	$65.04
7	80	$41.17	$8.15	$18.80	$0.00	$68.12
8	90	$46.31	$8.15	$19.83	$0.00	$74.29

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*	01/01/2019	$41.26	$8.15	$20.85	$0.00	$70.26
	07/01/2019	$42.36	$8.15	$20.85	$0.00	$71.36
	01/01/2020	$43.46	$8.15	$20.85	$0.00	$72.46
	07/01/2020	$44.56	$8.15	$20.85	$0.00	$73.56
	01/01/2021	$45.66	$8.15	$20.85	$0.00	$74.66

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.63	$8.15	$0.00	$0.00	$28.78
2	55	$22.69	$8.15	$5.64	$0.00	$36.48
3	60	$24.76	$8.15	$6.15	$0.00	$39.06
4	65	$26.82	$8.15	$6.66	$0.00	$41.63
5	70	$28.88	$8.15	$17.78	$0.00	$54.81
6	75	$30.95	$8.15	$18.29	$0.00	$57.39
7	80	$33.01	$8.15	$18.80	$0.00	$59.96
8	90	$37.13	$8.15	$19.83	$0.00	$65.11

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.18	$8.15	$0.00	$0.00	$29.33
2	55	$23.30	$8.15	$5.64	$0.00	$37.09
3	60	$25.42	$8.15	$6.15	$0.00	$39.72
4	65	$27.53	$8.15	$6.66	$0.00	$42.34
5	70	$29.65	$8.15	$17.78	$0.00	$55.58
6	75	$31.77	$8.15	$18.29	$0.00	$58.21
7	80	$33.89	$8.15	$18.80	$0.00	$60.84
8	90	$38.12	$8.15	$19.83	$0.00	$66.10

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2019	$39.32	$8.15	$20.85	$0.00	$68.32
	07/01/2019	$40.42	$8.15	$20.85	$0.00	$69.42
	01/01/2020	$41.52	$8.15	$20.85	$0.00	$70.52
	07/01/2020	$42.62	$8.15	$20.85	$0.00	$71.62
	01/01/2021	$43.72	$8.15	$20.85	$0.00	$72.72

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.66	$8.15	$0.00	$0.00	$27.81
2	55	$21.63	$8.15	$5.64	$0.00	$35.42
3	60	$23.59	$8.15	$6.15	$0.00	$37.89
4	65	$25.56	$8.15	$6.66	$0.00	$40.37
5	70	$27.52	$8.15	$17.78	$0.00	$53.45
6	75	$29.49	$8.15	$18.29	$0.00	$55.93
7	80	$31.46	$8.15	$18.80	$0.00	$58.41
8	90	$35.39	$8.15	$19.83	$0.00	$63.37

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.21	$8.15	$0.00	$0.00	$28.36
2	55	$22.23	$8.15	$5.64	$0.00	$36.02
3	60	$24.25	$8.15	$6.15	$0.00	$38.55
4	65	$26.27	$8.15	$6.66	$0.00	$41.08
5	70	$28.29	$8.15	$17.78	$0.00	$54.22
6	75	$30.32	$8.15	$18.29	$0.00	$56.76
7	80	$32.34	$8.15	$18.80	$0.00	$59.29
8	90	$36.38	$8.15	$19.83	$0.00	$64.36

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS) *LABORERS - ZONE 2*	12/01/2018	$33.52	$7.85	$14.44	$0.00	$55.81
	06/01/2019	$34.39	$7.85	$14.44	$0.00	$56.68
	12/01/2019	$35.25	$7.85	$14.44	$0.00	$57.54
	06/01/2020	$36.14	$7.85	$14.44	$0.00	$58.43
	12/01/2020	$37.03	$7.85	$14.44	$0.00	$59.32
	06/01/2021	$37.95	$7.85	$14.44	$0.00	$60.24
	12/01/2021	$38.86	$7.85	$14.44	$0.00	$61.15
For Apprentice rates see "Apprentice- LABORER"						
PAINTER / TAPER (BRUSH, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*	01/01/2019	$39.86	$8.15	$20.85	$0.00	$68.86
	07/01/2019	$40.96	$8.15	$20.85	$0.00	$69.96
	01/01/2020	$42.06	$8.15	$20.85	$0.00	$71.06
	07/01/2020	$43.16	$8.15	$20.85	$0.00	$72.16
	01/01/2021	$44.25	$8.15	$20.85	$0.00	$73.25

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.93	$8.15	$0.00	$0.00	$28.08
2	55	$21.92	$8.15	$5.64	$0.00	$35.71
3	60	$23.92	$8.15	$6.15	$0.00	$38.22
4	65	$25.91	$8.15	$6.66	$0.00	$40.72
5	70	$27.90	$8.15	$17.78	$0.00	$53.83
6	75	$29.90	$8.15	$18.29	$0.00	$56.34
7	80	$31.89	$8.15	$18.80	$0.00	$58.84
8	90	$35.87	$8.15	$19.83	$0.00	$63.85

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.48	$8.15	$0.00	$0.00	$28.63
2	55	$22.53	$8.15	$5.64	$0.00	$36.32
3	60	$24.58	$8.15	$6.15	$0.00	$38.88
4	65	$26.62	$8.15	$6.66	$0.00	$41.43
5	70	$28.67	$8.15	$17.78	$0.00	$54.60
6	75	$30.72	$8.15	$18.29	$0.00	$57.16
7	80	$32.77	$8.15	$18.80	$0.00	$59.72
8	90	$36.86	$8.15	$19.83	$0.00	$64.84

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2019	$37.92	$8.15	$20.85	$0.00	$66.92
	07/01/2019	$39.02	$8.15	$20.85	$0.00	$68.02
	01/01/2020	$40.12	$8.15	$20.85	$0.00	$69.12
	07/01/2020	$41.22	$8.15	$20.85	$0.00	$70.22
	01/01/2021	$42.32	$8.15	$20.85	$0.00	$71.32

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.96	$8.15	$0.00	$0.00	$27.11
2	55	$20.86	$8.15	$5.64	$0.00	$34.65
3	60	$22.75	$8.15	$6.15	$0.00	$37.05
4	65	$24.65	$8.15	$6.66	$0.00	$39.46
5	70	$26.54	$8.15	$17.78	$0.00	$52.47
6	75	$28.44	$8.15	$18.29	$0.00	$54.88
7	80	$30.34	$8.15	$18.80	$0.00	$57.29
8	90	$34.13	$8.15	$19.83	$0.00	$62.11

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.51	$8.15	$0.00	$0.00	$27.66
2	55	$21.46	$8.15	$5.64	$0.00	$35.25
3	60	$23.41	$8.15	$6.15	$0.00	$37.71
4	65	$25.36	$8.15	$6.66	$0.00	$40.17
5	70	$27.31	$8.15	$17.78	$0.00	$53.24
6	75	$29.27	$8.15	$18.29	$0.00	$55.71
7	80	$31.22	$8.15	$18.80	$0.00	$58.17
8	90	$35.12	$8.15	$19.83	$0.00	$63.10

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$33.08	$11.91	$12.70	$0.00	$57.69
	06/01/2019	$34.08	$11.91	$12.70	$0.00	$58.69
	08/01/2019	$34.08	$12.41	$12.70	$0.00	$59.19
	12/01/2019	$34.08	$12.41	$13.72	$0.00	$60.21
	06/01/2020	$34.98	$12.41	$13.72	$0.00	$61.11
	08/01/2020	$34.98	$12.91	$13.72	$0.00	$61.61
	12/01/2020	$34.98	$12.91	$14.82	$0.00	$62.71
	06/01/2021	$35.78	$12.91	$14.82	$0.00	$63.51
	08/01/2021	$35.78	$13.41	$14.82	$0.00	$64.01
	12/01/2021	$35.78	$13.41	$16.01	$0.00	$65.20
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2018	$46.57	$9.90	$21.15	$0.00	$77.62
	08/01/2019	$48.94	$9.90	$21.15	$0.00	$79.99
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2018	$46.57	$9.90	$21.15	$0.00	$77.62
	08/01/2019	$48.94	$9.90	$21.15	$0.00	$79.99

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.29	$9.90	$21.15	$0.00	$54.34
2	60	$27.94	$9.90	$21.15	$0.00	$58.99
3	70	$32.60	$9.90	$21.15	$0.00	$63.65
4	75	$34.93	$9.90	$21.15	$0.00	$65.98
5	80	$37.26	$9.90	$21.15	$0.00	$68.31
6	80	$37.26	$9.90	$21.15	$0.00	$68.31
7	90	$41.91	$9.90	$21.15	$0.00	$72.96
8	90	$41.91	$9.90	$21.15	$0.00	$72.96

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.47	$9.90	$21.15	$0.00	$55.52
2	60	$29.36	$9.90	$21.15	$0.00	$60.41
3	70	$34.26	$9.90	$21.15	$0.00	$65.31
4	75	$36.71	$9.90	$21.15	$0.00	$67.76
5	80	$39.15	$9.90	$21.15	$0.00	$70.20
6	80	$39.15	$9.90	$21.15	$0.00	$70.20
7	90	$44.05	$9.90	$21.15	$0.00	$75.10
8	90	$44.05	$9.90	$21.15	$0.00	$75.10

Notes:

Apprentice to Journeyworker Ratio:1:5

PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537*	09/01/2018	$52.94	$9.95	$18.74	$0.00	$81.63
	09/01/2019	$54.44	$9.95	$18.74	$0.00	$83.13
	09/01/2020	$55.94	$9.95	$18.74	$0.00	$84.63

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$21.18	$9.95	$7.75	$0.00	$38.88
2	45	$23.82	$9.95	$18.74	$0.00	$52.51
3	60	$31.76	$9.95	$18.74	$0.00	$60.45
4	70	$37.06	$9.95	$18.74	$0.00	$65.75
5	80	$42.35	$9.95	$18.74	$0.00	$71.04

Effective Date - 09/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$21.78	$9.95	$7.75	$0.00	$39.48
2	45	$24.50	$9.95	$18.74	$0.00	$53.19
3	60	$32.66	$9.95	$18.74	$0.00	$61.35
4	70	$38.11	$9.95	$18.74	$0.00	$66.80
5	80	$43.55	$9.95	$18.74	$0.00	$72.24

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.

Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	09/01/2018	$55.69	$11.82	$16.01	$0.00	$83.52
	03/01/2019	$57.19	$11.82	$16.01	$0.00	$85.02
	09/01/2019	$58.69	$11.82	$16.01	$0.00	$86.52
	03/01/2020	$60.19	$11.82	$16.01	$0.00	$88.02
	09/01/2020	$61.69	$11.82	$16.01	$0.00	$89.52
	03/01/2021	$63.19	$11.82	$16.01	$0.00	$91.02

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.49	$11.82	$5.81	$0.00	$37.12
2	40	$22.28	$11.82	$6.59	$0.00	$40.69
3	55	$30.63	$11.82	$8.98	$0.00	$51.43
4	65	$36.20	$11.82	$10.53	$0.00	$58.55
5	75	$41.77	$11.82	$12.13	$0.00	$65.72

Effective Date - 03/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$20.02	$11.82	$5.81	$0.00	$37.65
2	40	$22.88	$11.82	$6.59	$0.00	$41.29
3	55	$31.45	$11.82	$8.98	$0.00	$52.25
4	65	$37.17	$11.82	$10.53	$0.00	$59.52
5	75	$42.89	$11.82	$12.13	$0.00	$66.84

Notes:

** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$62.12, Step5 with lic$69.27

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	09/01/2018	$52.94	$9.95	$18.74	$0.00	$81.63
	09/01/2019	$54.44	$9.95	$18.74	$0.00	$83.13
	09/01/2020	$55.94	$9.95	$18.74	$0.00	$84.63
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER *LABORERS - ZONE 2*	12/01/2018	$34.52	$7.85	$14.44	$0.00	$56.81
	06/01/2019	$35.39	$7.85	$14.44	$0.00	$57.68
	12/01/2019	$36.25	$7.85	$14.44	$0.00	$58.54
	06/01/2020	$37.14	$7.85	$14.44	$0.00	$59.43
	12/01/2020	$38.03	$7.85	$14.44	$0.00	$60.32
	06/01/2021	$38.95	$7.85	$14.44	$0.00	$61.24
	12/01/2021	$39.86	$7.85	$14.44	$0.00	$62.15
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.58	$11.50	$15.60	$0.00	$74.68
	06/01/2019	$48.68	$11.50	$15.60	$0.00	$75.78
	12/01/2019	$49.83	$11.50	$15.60	$0.00	$76.93
	06/01/2020	$50.93	$11.50	$15.60	$0.00	$78.03
	12/01/2020	$52.08	$11.50	$15.60	$0.00	$79.18
	06/01/2021	$53.18	$11.50	$15.60	$0.00	$80.28
	12/01/2021	$54.33	$11.50	$15.60	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.58	$11.50	$15.60	$0.00	$74.68
	06/01/2019	$48.68	$11.50	$15.60	$0.00	$75.78
	12/01/2019	$49.83	$11.50	$15.60	$0.00	$76.93
	06/01/2020	$50.93	$11.50	$15.60	$0.00	$78.03
	12/01/2020	$52.08	$11.50	$15.60	$0.00	$79.18
	06/01/2021	$53.18	$11.50	$15.60	$0.00	$80.28
	12/01/2021	$54.33	$11.50	$15.60	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$32.03	$11.50	$15.60	$0.00	$59.13
	06/01/2019	$32.78	$11.50	$15.60	$0.00	$59.88
	12/01/2019	$33.57	$11.50	$15.60	$0.00	$60.67
	06/01/2020	$34.32	$11.50	$15.60	$0.00	$61.42
	12/01/2020	$35.10	$11.50	$15.60	$0.00	$62.20
	06/01/2021	$35.85	$11.50	$15.60	$0.00	$62.95
	12/01/2021	$36.64	$11.50	$15.60	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS LOCAL 170*	01/01/2019	$25.12	$10.41	$8.56	$0.00	$44.09
	12/01/2019	$25.15	$10.41	$8.56	$0.00	$44.12
	01/01/2020	$25.15	$10.46	$8.56	$0.00	$44.17
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	02/01/2019	$43.36	$11.50	$15.90	$0.00	$70.76

Apprentice - *ROOFER - Local 33*

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.68	$11.50	$3.69	$0.00	$36.87
2	60	$26.02	$11.50	$15.90	$0.00	$53.42
3	65	$28.18	$11.50	$15.90	$0.00	$55.58
4	75	$32.52	$11.50	$15.90	$0.00	$59.92
5	85	$36.86	$11.50	$15.90	$0.00	$64.26

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 *ROOFERS LOCAL 33*	02/01/2019	$43.61	$11.50	$15.90	$0.00	$71.01
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2018	$44.11	$12.20	$24.12	$2.41	$82.84

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.64	$12.20	$5.61	$0.00	$35.45
2	40	$17.64	$12.20	$5.61	$0.00	$35.45
3	45	$19.85	$12.20	$10.85	$1.29	$44.19
4	45	$19.85	$12.20	$10.85	$1.29	$44.19
5	50	$22.06	$12.20	$11.80	$1.38	$47.44
6	50	$22.06	$12.20	$12.05	$1.39	$47.70
7	60	$26.47	$12.20	$13.70	$1.57	$53.94
8	65	$28.67	$12.20	$14.65	$1.67	$57.19
9	75	$33.08	$12.20	$16.56	$1.86	$63.70
10	85	$37.49	$12.20	$17.96	$2.03	$69.68

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SIGN ERECTOR *PAINTERS LOCAL 35 - ZONE 2*	06/01/2013	$25.81	$7.07	$7.05	$0.00	$39.93

Apprentice - *SIGN ERECTOR - Local 35 Zone 2*

Effective Date - 06/01/2013

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

Notes:
Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$33.54	$11.91	$12.70	$0.00	$58.15
	06/01/2019	$34.54	$11.91	$12.70	$0.00	$59.15
	08/01/2019	$34.54	$12.41	$12.70	$0.00	$59.65
	12/01/2019	$34.54	$12.41	$13.72	$0.00	$60.67
	06/01/2020	$35.44	$12.41	$13.72	$0.00	$61.57
	08/01/2020	$35.44	$12.91	$13.72	$0.00	$62.07
	12/01/2020	$35.44	$12.91	$14.82	$0.00	$63.17
	06/01/2021	$36.24	$12.91	$14.82	$0.00	$63.97
	08/01/2021	$36.24	$13.41	$14.82	$0.00	$64.47
	12/01/2021	$36.24	$13.41	$16.01	$0.00	$65.66
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$33.83	$11.91	$12.70	$0.00	$58.44
	06/01/2019	$34.83	$11.91	$12.70	$0.00	$59.44
	08/01/2019	$34.83	$12.41	$12.70	$0.00	$59.94
	12/01/2019	$34.83	$12.41	$13.72	$0.00	$60.96
	06/01/2020	$35.73	$12.41	$13.72	$0.00	$61.86
	08/01/2020	$35.73	$12.91	$13.72	$0.00	$62.36
	12/01/2020	$35.73	$12.91	$14.82	$0.00	$63.46
	06/01/2021	$36.53	$12.91	$14.82	$0.00	$64.26
	08/01/2021	$36.53	$13.41	$14.82	$0.00	$64.76
	12/01/2021	$36.53	$13.41	$16.01	$0.00	$65.95
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1*	01/01/2019	$57.98	$9.47	$19.10	$0.00	$86.55
	03/01/2019	$58.98	$9.47	$19.60	$0.00	$88.05
	10/01/2019	$60.48	$9.47	$19.60	$0.00	$89.55
	03/01/2020	$61.98	$9.47	$19.60	$0.00	$91.05
	10/01/2020	$63.48	$9.47	$19.60	$0.00	$92.55
	03/01/2021	$64.98	$9.47	$19.60	$0.00	$94.05

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$20.29	$9.47	$9.10	$0.00	$38.86
2	40	$23.19	$9.47	$9.10	$0.00	$41.76
3	45	$26.09	$9.47	$9.10	$0.00	$44.66
4	50	$28.99	$9.47	$9.10	$0.00	$47.56
5	55	$31.89	$9.47	$9.10	$0.00	$50.46
6	60	$34.79	$9.47	$10.60	$0.00	$54.86
7	65	$37.69	$9.47	$10.60	$0.00	$57.76
8	70	$40.59	$9.47	$10.60	$0.00	$60.66
9	75	$43.49	$9.47	$10.60	$0.00	$63.56
10	80	$46.38	$9.47	$10.60	$0.00	$66.45

Effective Date - 03/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$20.64	$9.47	$9.10	$0.00	$39.21
2	40	$23.59	$9.47	$9.10	$0.00	$42.16
3	45	$26.54	$9.47	$9.10	$0.00	$45.11
4	50	$29.49	$9.47	$9.10	$0.00	$48.06
5	55	$32.44	$9.47	$9.10	$0.00	$51.01
6	60	$35.39	$9.47	$10.60	$0.00	$55.46
7	65	$38.34	$9.47	$10.60	$0.00	$58.41
8	70	$41.29	$9.47	$10.60	$0.00	$61.36
9	75	$44.24	$9.47	$10.60	$0.00	$64.31
10	80	$47.18	$9.47	$10.60	$0.00	$67.25

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

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	09/01/2018	$37.97	$13.00	$16.35	$0.00	$67.32
	03/01/2019	$38.33	$13.00	$16.82	$0.00	$68.15

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$15.19	$13.00	$0.46	$0.00	$28.65
2	40	$15.19	$13.00	$0.46	$0.00	$28.65
3	45	$17.09	$13.00	$13.06	$0.00	$43.15
4	45	$17.09	$13.00	$13.06	$0.00	$43.15
5	50	$18.99	$13.00	$13.37	$0.00	$45.36
6	55	$20.88	$13.00	$13.67	$0.00	$47.55
7	60	$22.78	$13.00	$13.96	$0.00	$49.74
8	65	$24.68	$13.00	$14.26	$0.00	$51.94
9	70	$26.58	$13.00	$14.56	$0.00	$54.14
10	75	$28.48	$13.00	$14.85	$0.00	$56.33

Effective Date - 03/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$15.33	$13.00	$0.46	$0.00	$28.79
2	40	$15.33	$13.00	$0.46	$0.00	$28.79
3	45	$17.25	$13.00	$13.42	$0.00	$43.67
4	45	$17.25	$13.00	$13.42	$0.00	$43.67
5	50	$19.17	$13.00	$13.73	$0.00	$45.90
6	55	$21.08	$13.00	$14.03	$0.00	$48.11
7	60	$23.00	$13.00	$14.34	$0.00	$50.34
8	65	$24.91	$13.00	$14.66	$0.00	$52.57
9	70	$26.83	$13.00	$14.96	$0.00	$54.79
10	75	$28.75	$13.00	$15.27	$0.00	$57.02

Notes:

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2019	$52.49	$10.75	$20.66	$0.00	$83.90
	08/01/2019	$53.84	$10.75	$20.80	$0.00	$85.39
	02/01/2020	$54.48	$10.75	$20.80	$0.00	$86.03
	08/01/2020	$55.83	$10.75	$20.95	$0.00	$87.53
	02/01/2021	$56.47	$10.75	$20.95	$0.00	$88.17
	08/01/2021	$57.87	$10.75	$21.11	$0.00	$89.73
	02/01/2022	$58.46	$10.75	$21.11	$0.00	$90.32

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

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.25	$10.75	$20.03	$0.00	$57.03
2	60	$31.49	$10.75	$20.03	$0.00	$62.27
3	70	$36.74	$10.75	$20.03	$0.00	$67.52
4	80	$41.99	$10.75	$20.03	$0.00	$72.77
5	90	$47.24	$10.75	$20.03	$0.00	$78.02

Effective Date - 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.92	$10.75	$20.80	$0.00	$58.47
2	60	$32.30	$10.75	$20.80	$0.00	$63.85
3	70	$37.69	$10.75	$20.80	$0.00	$69.24
4	80	$43.07	$10.75	$20.80	$0.00	$74.62
5	90	$48.46	$10.75	$20.80	$0.00	$80.01

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	12/01/2018	$40.00	$7.85	$15.55	$0.00	$63.40
	06/01/2019	$41.00	$7.85	$15.55	$0.00	$64.40
	12/01/2019	$42.00	$7.85	$15.55	$0.00	$65.40
	06/01/2020	$42.99	$7.85	$15.55	$0.00	$66.39
	12/01/2020	$43.97	$7.85	$15.55	$0.00	$67.37
	06/01/2021	$44.99	$7.85	$15.55	$0.00	$68.39
	12/01/2021	$46.00	$7.85	$15.55	$0.00	$69.40

For apprentice rates see "Apprentice- LABORER"

TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	12/01/2018	$38.72	$7.85	$15.55	$0.00	$62.12
	06/01/2019	$39.72	$7.85	$15.55	$0.00	$63.12
	12/01/2019	$40.72	$7.85	$15.55	$0.00	$64.12
	06/01/2020	$41.71	$7.85	$15.55	$0.00	$65.11
	12/01/2020	$42.69	$7.85	$15.55	$0.00	$66.09
	06/01/2021	$43.71	$7.85	$15.55	$0.00	$67.11
	12/01/2021	$44.72	$7.85	$15.55	$0.00	$68.12

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2018	$38.60	$7.85	$15.55	$0.00	$62.00
	06/01/2019	$39.60	$7.85	$15.55	$0.00	$63.00
	12/01/2019	$40.60	$7.85	$15.55	$0.00	$64.00
	06/01/2020	$41.59	$7.85	$15.55	$0.00	$64.99
	12/01/2020	$42.57	$7.85	$15.55	$0.00	$65.97
	06/01/2021	$43.59	$7.85	$15.55	$0.00	$66.99
	12/01/2021	$44.60	$7.85	$15.55	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.10	$11.50	$15.60	$0.00	$74.20
	06/01/2019	$48.19	$11.50	$15.60	$0.00	$75.29
	12/01/2019	$49.33	$11.50	$15.60	$0.00	$76.43
	06/01/2020	$50.41	$11.50	$15.60	$0.00	$77.51
	12/01/2020	$51.55	$11.50	$15.60	$0.00	$78.65
	06/01/2021	$52.64	$11.50	$15.60	$0.00	$79.74
	12/01/2021	$53.78	$11.50	$15.60	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$34.12	$11.91	$12.70	$0.00	$58.73
	06/01/2019	$35.12	$11.91	$12.70	$0.00	$59.73
	08/01/2019	$35.12	$12.41	$12.70	$0.00	$60.23
	12/01/2019	$35.12	$12.41	$13.72	$0.00	$61.25
	06/01/2020	$36.02	$12.41	$13.72	$0.00	$62.15
	08/01/2020	$36.02	$12.91	$13.72	$0.00	$62.65
	12/01/2020	$36.02	$12.91	$14.82	$0.00	$63.75
	06/01/2021	$36.82	$12.91	$14.82	$0.00	$64.55
	08/01/2021	$36.82	$13.41	$14.82	$0.00	$65.05
	12/01/2021	$36.82	$13.41	$16.01	$0.00	$66.24
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	12/01/2018	$50.88	$7.85	$15.95	$0.00	$74.68
	06/01/2019	$51.88	$7.85	$15.95	$0.00	$75.68
	12/01/2019	$52.88	$7.85	$15.95	$0.00	$76.68
	06/01/2020	$53.87	$7.85	$15.95	$0.00	$77.67
	12/01/2020	$54.85	$7.85	$15.95	$0.00	$78.65
	06/01/2021	$55.87	$7.85	$15.95	$0.00	$79.67
	12/01/2021	$56.88	$7.85	$15.95	$0.00	$80.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	12/01/2018	$52.88	$7.85	$15.95	$0.00	$76.68
	06/01/2019	$53.88	$7.85	$15.95	$0.00	$77.68
	12/01/2019	$54.88	$7.85	$15.95	$0.00	$78.68
	06/01/2020	$55.87	$7.85	$15.95	$0.00	$79.67
	12/01/2020	$56.85	$7.85	$15.95	$0.00	$80.65
	06/01/2021	$57.87	$7.85	$15.95	$0.00	$81.67
	12/01/2021	$58.88	$7.85	$15.95	$0.00	$82.68
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	12/01/2018	$42.95	$7.85	$15.95	$0.00	$66.75
	06/01/2019	$43.95	$7.85	$15.95	$0.00	$67.75
	12/01/2019	$44.95	$7.85	$15.95	$0.00	$68.75
	06/01/2020	$45.94	$7.85	$15.95	$0.00	$69.74
	12/01/2020	$46.92	$7.85	$15.95	$0.00	$70.72
	06/01/2021	$47.94	$7.85	$15.95	$0.00	$71.74
	12/01/2021	$48.95	$7.85	$15.95	$0.00	$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	12/01/2018	$44.95	$7.85	$15.95	$0.00	$68.75
	06/01/2019	$45.95	$7.85	$15.95	$0.00	$69.75
	12/01/2019	$46.95	$7.85	$15.95	$0.00	$70.75
	06/01/2020	$47.94	$7.85	$15.95	$0.00	$71.74
	12/01/2020	$48.92	$7.85	$15.95	$0.00	$72.72
	06/01/2021	$49.94	$7.85	$15.95	$0.00	$73.74
	12/01/2021	$50.95	$7.85	$15.95	$0.00	$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2018	$33.54	$11.91	$12.70	$0.00	$58.15
	06/01/2019	$34.54	$11.91	$12.70	$0.00	$59.15
	08/01/2019	$34.54	$12.41	$12.70	$0.00	$59.65
	12/01/2019	$34.54	$12.41	$13.72	$0.00	$60.67
	06/01/2020	$35.44	$12.41	$13.72	$0.00	$61.57
	08/01/2020	$35.44	$12.91	$13.72	$0.00	$62.07
	12/01/2020	$35.44	$12.91	$14.82	$0.00	$63.17
	06/01/2021	$36.24	$12.91	$14.82	$0.00	$63.97
	08/01/2021	$36.24	$13.41	$14.82	$0.00	$64.47
	12/01/2021	$36.24	$13.41	$16.01	$0.00	$65.66
WAGON DRILL OPERATOR *LABORERS - ZONE 2*	12/01/2018	$33.77	$7.85	$14.44	$0.00	$56.06
	06/01/2019	$34.64	$7.85	$14.44	$0.00	$56.93
	12/01/2019	$35.50	$7.85	$14.44	$0.00	$57.79
	06/01/2020	$36.39	$7.85	$14.44	$0.00	$58.68
	12/01/2020	$37.28	$7.85	$14.44	$0.00	$59.57
	06/01/2021	$38.20	$7.85	$14.44	$0.00	$60.49
	12/01/2021	$39.11	$7.85	$14.44	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2018	$47.58	$11.50	$15.60	$0.00	$74.68
	06/01/2019	$48.68	$11.50	$15.60	$0.00	$75.78
	12/01/2019	$49.83	$11.50	$15.60	$0.00	$76.93
	06/01/2020	$50.93	$11.50	$15.60	$0.00	$78.03
	12/01/2020	$52.08	$11.50	$15.60	$0.00	$79.18
	06/01/2021	$53.18	$11.50	$15.60	$0.00	$80.28
	12/01/2021	$54.33	$11.50	$15.60	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	09/01/2018	$55.69	$11.82	$16.01	$0.00	$83.52
	03/01/2019	$57.19	$11.82	$16.01	$0.00	$85.02
	09/01/2019	$58.69	$11.82	$16.01	$0.00	$86.52
	03/01/2020	$60.19	$11.82	$16.01	$0.00	$88.02
	09/01/2020	$61.69	$11.82	$16.01	$0.00	$89.52
	03/01/2021	$63.19	$11.82	$16.01	$0.00	$91.02
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$27.14	$7.75	$1.81	$0.00	$36.70
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$38.45	$7.75	$9.53	$0.00	$55.73
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$31.66	$7.75	$9.44	$0.00	$48.85
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$24.88	$7.75	$1.75	$0.00	$34.38
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$38.45	$7.75	$13.61	$0.00	$59.81
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$33.92	$7.75	$10.21	$0.00	$51.88
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$24.88	$7.75	$1.75	$0.00	$34.38
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$20.35	$7.75	$1.61	$0.00	$29.71
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/03/2017	$45.23	$7.75	$16.61	$0.00	$69.59

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 09/03/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$27.14	$7.75	$3.31	$0.00	$38.20
2	65	$29.40	$7.75	$3.38	$0.00	$40.53
3	70	$31.66	$7.75	$3.45	$0.00	$42.86
4	75	$33.92	$7.75	$5.02	$0.00	$46.69
5	80	$36.18	$7.75	$5.09	$0.00	$49.02
6	85	$38.45	$7.75	$5.15	$0.00	$51.35
7	90	$40.71	$7.75	$7.22	$0.00	$55.68

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$30.73	$4.70	$3.17	$0.00	$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TREE TRIMMER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/31/2016	$18.51	$3.55	$0.00	$0.00	$22.06

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.

TREE TRIMMER GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/31/2016	$16.32	$3.55	$0.00	$0.00	$19.87

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.

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.

APPENDIX B

SECTIONS OF MASSACHUSETTS GENERAL LAW

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CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39F. Construction contracts; assignment and subrogation; subcontractor defined; enforcement of claim for direct payment; deposit, reduction of disputed amounts

Section 39F. (1) Every contract awarded pursuant to sections forty-four A to L, inclusive, of chapter one hundred and forty-nine shall contain the following subparagraphs (a) through (i) and every contract awarded pursuant to section thirty-nine M of chapter thirty shall contain the following subparagraphs (a) through (h) and in each case those subparagraphs shall be binding between the general contractor and each subcontractor.

(a) Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(b) Not later than the sixty-fifth day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(c) Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor; and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

(d) If, within seventy days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the

subcontractor may demand direct payment of that balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the subcontractor has substantially completed the subcontract work. Within ten days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.

(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided, that the awarding authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general contractor and the subcontractor or as determined by decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors.

All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of such payment.

(h) The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor.

(i) If the subcontractor does not receive payment as provided in subparagraph (a) or if the general contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the subcontractor and the subcontractor does not receive payment for same when due less the deductions provided for in subparagraph (a), the subcontractor may demand direct payment by following the procedure in subparagraph (d) and the general contractor may file a sworn reply as provided in that same subparagraph. A demand made after the first day of the month following that for which the subcontractor performed or furnished the labor and materials for which the subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the general contractor. Thereafter the awarding authority shall proceed as provided in subparagraph (e), (f), (g) and (h).

(2) Any assignment by a subcontractor of the rights under this section to a surety company furnishing a bond under the provisions of section twenty-nine of chapter one hundred forty-nine shall be invalid. The assignment and subrogation rights of the surety to amounts included in a demand for direct payment which are in the possession of the awarding authority or which are on deposit pursuant to subparagraph (f) of paragraph (1) shall be subordinate to the rights of all subcontractors who are entitled to be paid under this section and who have not been paid in full.

(3) “Subcontractor” as used in this section (i) for contracts awarded as provided in sections forty-four A to forty-four H, inclusive, of chapter one hundred forty-nine shall mean a person who files a sub-bid and receives a subcontract as a result of that filed sub-bid or who is approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, (ii) for contracts awarded as provided in paragraph (a) of section thirty-nine M of chapter thirty shall mean a person approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, and (iii) for contracts with the commonwealth not awarded as provided in forty-four A to forty-four H, inclusive, of chapter one hundred forty-nine shall also mean a person contracting with the general contractor to supply materials used or employed in a public works project for a price in excess of five thousand dollars.

(4) A general contractor or a subcontractor shall enforce a claim to any portion of the amount of a demand for direct payment deposited as provided in subparagraph (f) of

paragraph 1 by a petition in equity in the superior court against the other and the bank shall not be a necessary party. A subcontractor shall enforce a claim for direct payment or a right to require a deposit as provided in subparagraph (f) of paragraph 1 by a petition in equity in the superior court against the awarding authority and the general contractor shall not be a necessary party. Upon motion of any party the court shall advance for speedy trial any petition filed as provided in this paragraph. Sections fifty-nine and fifty-nine B of chapter two hundred thirty-one shall apply to such petitions. The court shall enter an interlocutory decree upon which execution shall issue for any part of a claim found due pursuant to sections fifty-nine and fifty-nine B and, upon motion of any party, shall advance for speedy trial the petition to collect the remainder of the claim. Any party aggrieved by such interlocutory decree shall have the right to appeal therefrom as from a final decree. The court shall not consolidate for trial the petition of any subcontractor with the petition of one or more subcontractors or the same general contract unless the court finds that a substantial portion of the evidence of the same events during the course of construction (other than the fact that the claims sought to be consolidated arise under the same general contract) is applicable to the petitions sought to be consolidated and that such consolidation will prevent unnecessary duplication of evidence. A decree in any such proceeding shall not include interest on the disputed amount deposited in excess of the interest earned for the period of any such deposit. No person except a subcontractor filing a demand for direct payment for which no funds due the general contractor are available for direct payment shall have a right to file a petition in court of equity against the awarding authority claiming a demand for direct payment is premature and such subcontractor must file the petition before the awarding authority has made a direct payment to the subcontractor and has made a deposit of the disputed portion as provided in part (iii) of subparagraph (e) and in subparagraph (f) of paragraph (1).

(5) In any petition to collect any claim for which a subcontractor has filed a demand for direct payment the court shall, upon motion of the general contractor, reduce by the amount of any deposit of a disputed amount by the awarding authority as provided in part (iii) of subparagraph (e) and in subparagraph (f) of paragraph (1) any amount held under a trustee writ or pursuant to a restraining order or injunction.

Chapter 30: Section 39K. Public building construction contracts; payments

Section 39K. Every contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building by the commonwealth, or by any county, city, town, district, board, commission or other public body, when the amount is more than five thousand dollars in the case of the commonwealth and more than two thousand dollars in the case of any county, city, town, district, board, commission or other public body, shall contain the following paragraph:— Within fifteen days (30 days in the case of the commonwealth, including local housing authorities) after receipt from the contractor, at the place designated by the awarding authority if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the awarding authority will make a periodic payment to the contractor for the work

performed during the preceding month and for the materials not incorporated in the work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the contractor has title or to which a subcontractor has title and has authorized the contractor to transfer title to the awarding authority, upon certification by the contractor that he is the lawful owner and that the materials are free from all encumbrances, but less (1) a retention based on its estimate of the fair value of its claims against the contractor and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, and less (3) a retention not exceeding five per cent of the approved amount of the periodic payment. After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the contractor fully completes the work or substantially completes the work so that the value of the work remaining to be done is, in the estimate of the awarding authority, less than one per cent of the original contract price, or (b) the contractor substantially completes the work and the awarding authority takes possession for occupancy, whichever occurs first, the awarding authority shall pay the contractor the entire balance due on the contract less (1) a retention based on its estimate of the fair value of its claims against the contractor and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, or based on the record of payments by the contractor to the subcontractors under this contract if such record of payment indicates that the contractor has not paid subcontractors as provided in section thirty-nine F. If the awarding authority fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of three percentage points above the rediscount rate than charged by the Federal Reserve Bank of Boston commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the contractor; provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for final payment until fifteen days (twenty-four days in the case of the commonwealth) after receipt of such a periodic estimate from the contractor, at the place designated by the awarding authority if such a place is so designated. The contractor agrees to pay to each subcontractor a portion of any such interest paid in accordance with the amount due each subcontractor.

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

reconstruction, alteration, remodeling, repair or demolition of any public building to which this section applies.

All periodic estimates shall be submitted to the awarding authority, or to its designee as set forth in writing to the contractor, and the date of receipt by the awarding authority or its designee shall be marked on the estimate. All periodic estimates shall contain a separate item for each filed subtrade and each sub-subtrade listed in sub-bid form as required by specifications and a column listing the amount paid to each subcontractor and sub-subcontractor as of the date the periodic estimate is filed. The person making payment for the awarding authority shall add the daily interest provided for herein to each payment for each day beyond the due date based on the date of receipt marked on the estimate.

A certificate of the architect to the effect that the contractor has fully or substantially completed the work shall, subject to the provisions of section thirty-nine J, be conclusive for the purposes of this section.

Notwithstanding the provisions of this section, at any time after the value of the work remaining to be done is, in the estimation of the awarding authority, less than 1 per cent of the adjusted contract price, or the awarding authority has determined that the contractor has substantially completed the work and the awarding authority has taken possession for occupancy, the awarding authority may send to the general contractor by certified mail, return receipt requested, a complete and final list of all incomplete and unsatisfactory work items, including, for each item on the list, a good faith estimate of the fair and reasonable cost of completing such item. The general contractor shall then complete all such work items within 30 days of receipt of such list or before the contract completion date, whichever is later. If the general contractor fails to complete all incomplete and unsatisfactory work items within 45 days after receipt of such items furnished by the awarding authority or before the contract completion date, whichever is later, subsequent to an additional 14 days' written notice to the general contractor by certified mail, return receipt requested, the awarding authority may terminate the contract and complete the incomplete and unsatisfactory work items and charge the cost of same to the general contractor and such termination shall be without prejudice to any other rights or remedies the awarding authority may have under the contract. The awarding authority shall note any such termination in the evaluation form to be filed by the awarding authority pursuant to the provisions of section 44D of chapter 149.

Chapter 30: Section 39N. Construction contracts; equitable adjustment in contract price for differing subsurface or latent physical conditions

Section 39N. Every contract subject to section forty-four A of chapter one hundred and forty-nine or subject to section thirty-nine M of chapter thirty shall contain the following paragraph in its entirety and an awarding authority may adopt reasonable rules or

regulations in conformity with that paragraph concerning the filing, investigation and settlement of such claims:

If, during the progress of the work, the contractor or the awarding authority discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the contract documents either the contractor or the contracting authority may request an equitable adjustment in the contract price of the contract applying to work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a contractor, or upon its own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the contract documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the plans and contract documents and are of such a nature as to cause an increase or decrease in the cost of performance of the work or a change in the construction methods required for the performance of the work which results in an increase or decrease in the cost of the work, the contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly.

Chapter 30: Section 39O. Contracts for construction and materials; suspension, delay or interruption due to order of awarding authority; adjustment in contract price; written claim

Section 39O. Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety and, in the event a suspension, delay, interruption or failure to act of the awarding authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the general contractor for payment for an increase in the cost of his performance as provisions (a) and (b) give the general contractor against the awarding authority, but nothing in provisions (a) and (b) shall in any way change, modify or alter any other rights which the general contractor or the subcontractor may have against each other.

(a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act

to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.

(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act or failure to act involved in the claim.

APPENDIX C

PRICE ADJUSTMENT CLAUSES

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DOCUMENT 00812

SPECIAL PROVISIONS
MONTHLY PRICE ADJUSTMENT FOR DIESEL FUEL AND GASOLINE –
ENGLISH UNITS

Revised: 01/26/2009

This monthly fuel price adjustment is inserted in this contract because the national and worldwide energy situation has made the future cost of fuel unpredictable. This adjustment will provide for either additional compensation to the Contractor or repayment to the Commonwealth, depending on an increase or decrease in the average price of diesel fuel or gasoline.

This adjustment will be based on fuel usage factors for various items of work developed by the Highway Research Board in Circular 158, dated July 1974. These factors will be multiplied by the quantities of work done in each item during each monthly period and further multiplied by the variance in price from the Base Price to the Period Price.

The Base Price of Diesel Fuel and Gasoline will be the price as indicated in the Department's web site (www.mhd.state.ma.us) for the month in which the contract was bid, which includes State Tax.

The Period Price will be the average of prices charged to the State, including State Tax for the bulk purchases made during each month.

This adjustment will be effected only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No adjustment will be paid for work done beyond the extended completion date of any contract.

Any adjustment (increase or decrease) to estimated quantities made to each item at the time of final payment will have the fuel price adjustment figured at the average period price for the entire term of the project for the difference of quantity.

The fuel price adjustment will apply only to the following items of work at the fuel factors shown:

ITEMS COVERED	**FUEL FACTORS**	
	Diesel	**Gasoline**
Excavation: and Borrow Work: Items 120, 120.1, 121, 123, 124, 125, 127, 129.3, 140, 140.1, 141, 142, 143, 144., 150, 150.1, 151 and 151.1 (Both Factors used)	0.29 Gallons / CY.	0.15 Gallons / CY
Surfacing Work: All Items containing Hot Mix Asphalt	2.90 Gallons / Ton	Does Not Apply

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DOCUMENT 00814

SPECIAL PROVISIONS
PRICE ADJUSTMENT FOR PORTLAND CEMENT CONCRETE MIXES

January 12, 2009

This provision applies to all projects using greater than 100 Cubic Yards (76 Cubic Meters) of Portland cement concrete containing Portland cement as stipulated in the Notice to Contractors section of the Bid Documents. This Price Adjustment will occur on a monthly basis.

The Price Adjustment will be based on the variance in price for the Portland cement component only from the Base Price to the Period Price. It shall not include transportation or other charges.

The Base Price of Portland cement on a project is a fixed price determined at the time of bid by the Department by using the same method as for the determination of the Period Price (see below) and found in the Notice to Contractors.

The Period Price of Portland cement will be determined by using the latest published price, in dollars per ton (U.S.), for Portland cement (Type I) quoted for Boston, U.S.A. in the **Construction Economics** section of *ENR Engineering News-Record* magazine or at the ENR website http://www.enr.com under **Construction Economics**. The Period Price will be posted on the MassHighway website the Wednesday immediately following the publishing of the monthly price in ENR, which is normally the first week of the month.

The Contract Price of the Portland cement concrete mix will be paid under the respective item in the Contract. The price adjustment, as herein provided, upwards or downwards, will be made after the work has been performed, using the monthly period price for the month during which the work was performed.

The price adjustment applies only to the actual Portland cement content in the mix placed on the job in accordance with the Standard Specifications for Highways and Bridges, Division III, Section M4.02.01. No adjustments will be made for any cement replacement materials such as fly ash or ground granulated blast furnace slag.

The Price Adjustment will be a separate payment item. It will be determined by multiplying the number of cubic yards of Portland cement concrete placed during each monthly period times the Portland cement content percentage times the variance in price between the Base Price and Period Price of Portland cement.

This Price Adjustment will be paid only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No Price Adjustment will be allowed beyond the Completion Date of this Contract, unless there is a Department-approved extension of time.

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APPENDIX D

SUDBURY WATER DISTRICT RECORD DRAWINGS

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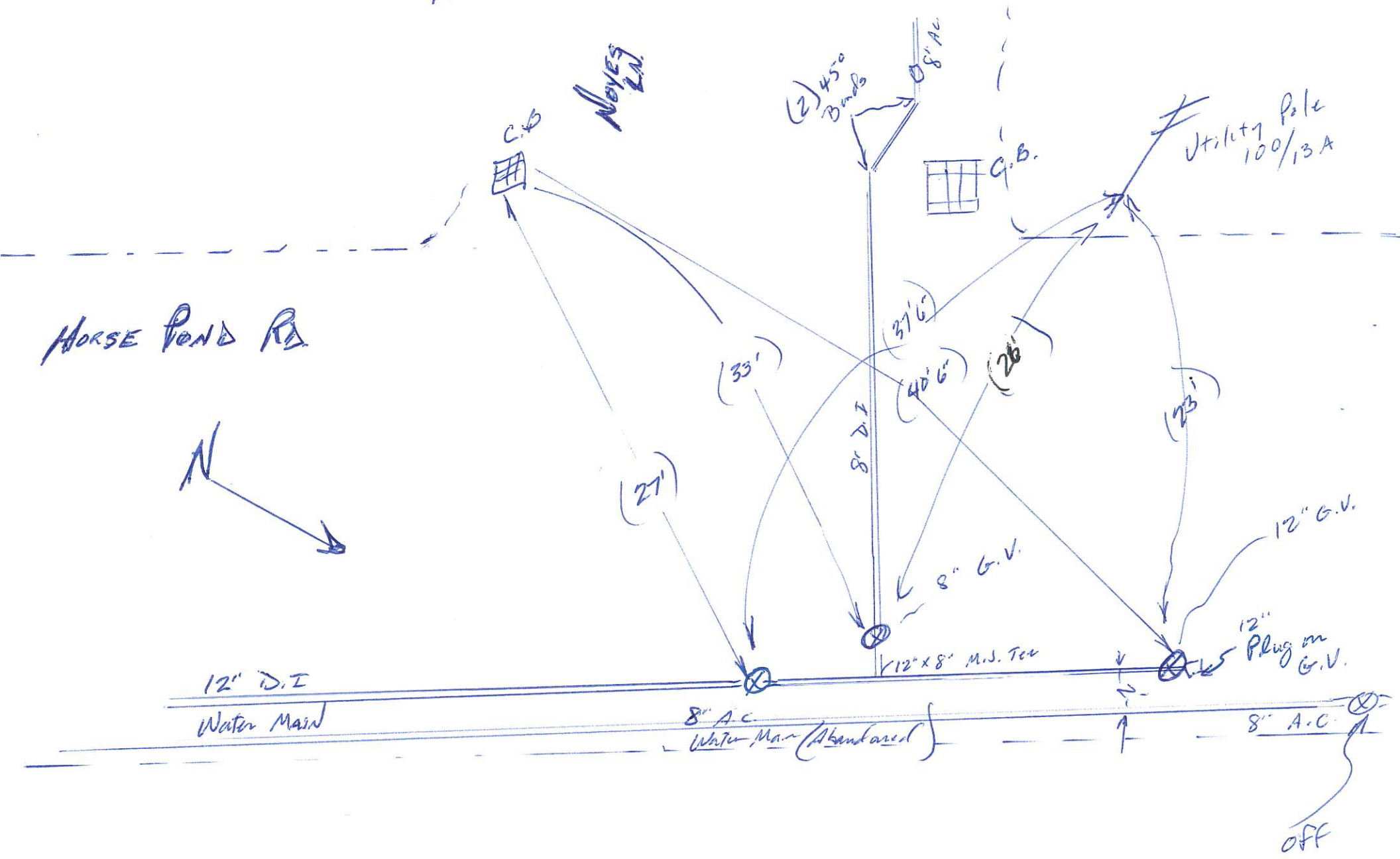
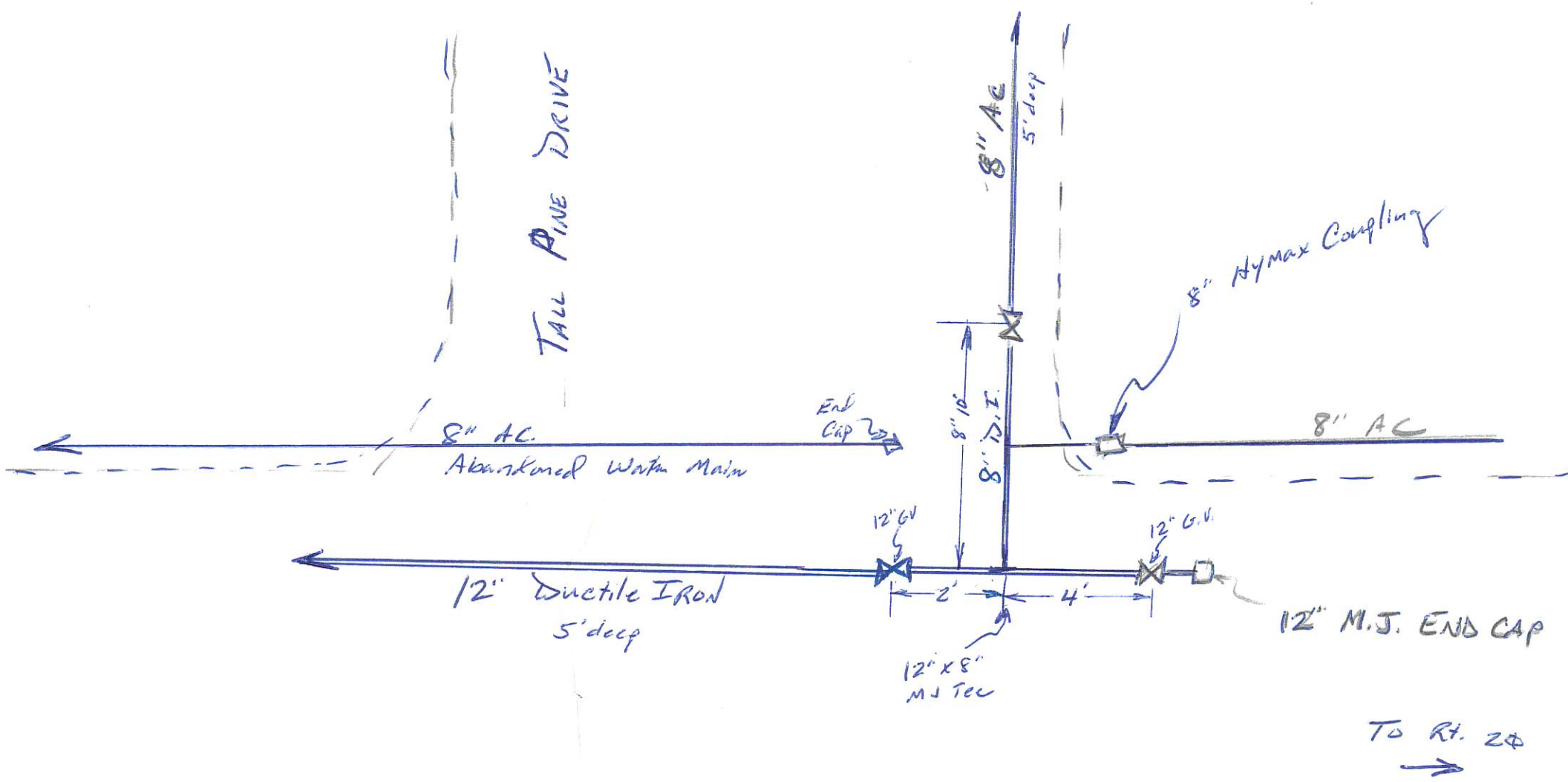
Horse Pond Road @ Noyes Lane

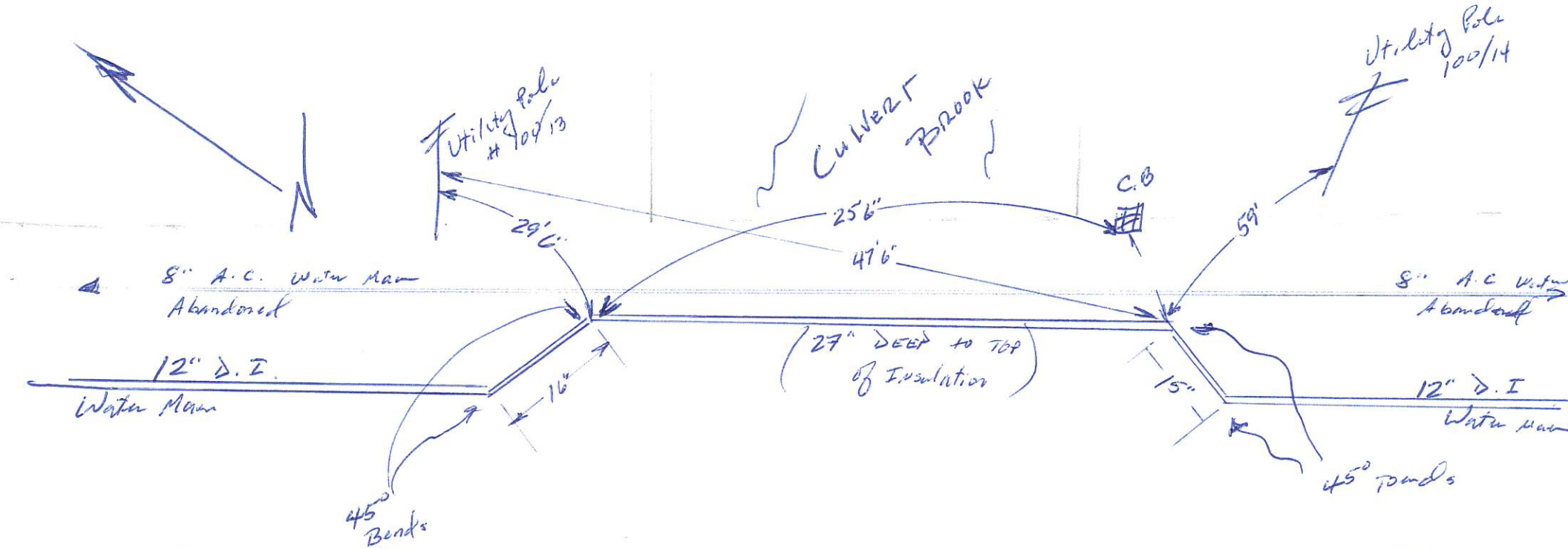


Sept. 2018


TALL PINE DRIVE
8" AC
5' deep
8" HyMax Coupling
End Cap
8" AC
Abandoned Water Main
8" AC
8" D.I.
8'-10"
12" G.V.
12" G.V.
12" Ductile IRON
5' deep
2'
4'
12" M.J. END CAP
12" x 8" MJ Tee
TO Rt. 20
HORSE POND ROAD
HORSE POND ROAD
TALL PINE DRIVE
N

Sept. 2018

Culvert Crossing Near 178 Horse Pond Roads



Noyes Lane

Horse Pond Rd.

To Rt. 20 →

Culvert Brook

Sept. 2018