TOWN OF WILMINGTON, MASSACHUSETTS

CONTRACT DOCUMENTS
FOR

SHAWSHEEN ELEMENTARY SCHOOL
TENNIS COURT RECONSTRUCTION

June 2, 2021

Town of Wilmington

Wilmington Town Hall

121 Glen Road

Wilmington, MA 01887

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SECTION 00020

INVITATION FOR BIDS

Sealed bids for furnishing the following item will be received at the Office of the Town Manager, Wilmington Town Hall, 121 Glen Road, Wilmington, MA 01887 until the time specified below at which time the bids will be publicly opened and read.

Bid Specifications are available for download at the Town of Wilmington's Purchasing Department website: https://www.wilmingtonma.gov/purchasing-department

Bids will be opened at Wilmington Town Hall on June 2, 2021, at 1:00 p.m. Each Bid must be accompanied by a bid security consisting of a BID BOND, CASH, or, CERTIFIED CHECK issued by a responsible bank or trust company in the amount of 5% of the bid price.

Pre-Bid Conference and Site Visit will be held at the Shawsheen Elementary School tennis courts located at 298 Shawsheen Avenue, Wilmington, MA, on May 20, 2021 at 10:00 a.m. It is imperative that all prospective bidders have a representative in attendance.

A performance bond in an amount equal to 100 percent of the total amount of the contract price 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 contract price.

All bids for this project are subject to applicable public bidding laws of Massachusetts, including, but not limited to G.L. c.30, §39M.

Attention is directed to the minimum wage rates to be paid as determined by the Commissioner of Labor and Workforce Development and the weekly payroll record submittal requirements under the provisions of Massachusetts General Laws, Chapter 149, Section 26 through 27D inclusive.

Selection of the contractor will be based upon bidder qualifications, including evidence of past performance in similar projects, and bid price. The contract will be awarded to the bidder deemed by the awarding authority to be the lowest responsible and eligible bidder.

The bidder agrees that its bid shall be good and may not be withdrawn for a period of 30 days, Saturdays, Sundays and legal holidays excluded, after the opening of the bids.

The Town reserves the right to waive any informalities, to accept or reject, in whole or in part any or all bids, or take whatever other action may be deemed to be in the best interest of the Town.

The Town of Wilmington

By: Jeffrey M. Hull, Town Manager

SECTION 00100

INSTRUCTIONS TO BIDDERS

1. Receipt and Opening of Bids

The Town of Wilmington, Massachusetts, herein called the Owner, acting by and through its Board of Selectmen, will receive sealed Bids for the project known as the Shawsheen Elementary School Tennis Court Reconstruction Project.

General bids shall be addressed to the Office of the Town Manager, Wilmington Town Hall, Wilmington, MA 01887 and endorsed "Bid for Shawsheen Elementary School Tennis Court Reconstruction Project" will be received at the Wilmington Town Hall until 1:00 p.m. prevailing time, on Wednesday, June 2, 2021 at which time and place said bids will be publicly opened and read aloud.

Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified will not be considered. The bidder agrees that its bid shall be good and may not be withdrawn for a period of 30 days, Saturdays, Sundays, and legal holidays excluded, after the opening of bids.

2. Location and Work to be Done

The Work consists of the reconstruction of existing tennis courts and all work incidental thereto, in accordance with the Specifications and conceptual plans attached hereto.

Additional drawings showing details in accordance with which the Work is to be done may be furnished by addendum from time to time during the bidding period by the Owner or its Architect/Engineer, and shall then become a part of the Contract Documents.

The Contractor shall furnish all labor, services, materials, equipment, plant, machinery, apparatus, appliances, tools, supplies, and all other things necessary to do all work required for the completion of each item of the Work and as herein specified.

The Work to be done and paid for under any item shall not be limited to the exact extent mentioned or described but shall include all incidental work necessary or customarily done for the completion of that item.

3. Preparation of Bid

Each bid must be submitted on the prescribed form. All blank spaces for bid prices must filled in, in ink or typewritten, in both words and figures.

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his address, and endorsed with the name of the project as specified in Receipt and Opening of Bids, above. If forwarded by mail, the sealed envelope containing the bid

must be enclosed in another envelope addressed as specified in Receipt and Opening of Bids, above.

4. Bid Opening Procedure

The following list of requirements shall apply to each filed bid. Bids not meeting all the requirements for timeliness and security will be rejected; bids not meeting signature and addenda requirements will be rejected prior to checking of bid amounts.

Bids shall be filed at the place and before the time specified in Receipt and Opening of Bids, above.

Properly executed bid security shall be placed in a sealed envelope and shall be attached to the outside of the envelope containing the bid.

Bid signatures will be checked.

All addenda will be sent certified mail, with return receipt requested, and/or facsimile or e-mail to all prospective bidders. All bidders shall include with their bids the written acknowledgment form provided in Section 00300, FORM OF GENERAL BID.

The total dollar amount of each bid will be read, and the three apparent lowest bids will be selected for further consideration. These three apparent low bids will be read aloud for the benefit of the other bidders and the bid opening procedure will be closed. All those present at the bid opening may examine all bids after the bid opening and after the reading of the three apparent low bids.

5. Modification

Any bidder may modify his bid by written communication at any time prior to the scheduled closing time for receipt of bids. Any telegraphic communication must be received by the Owner prior to the closing time, and, provided further, the Owner must be satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. If written confirmation is not received within two days from the closing time, no consideration will be given to a telegraphic communication.

The communication shall not reveal the bid price but shall provide the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened.

6. Ability and Experience of Bidder

No award will be made to any bidder who cannot satisfy the Owner that he has sufficient ability and experience in this class of work and sufficient capital and plant to enable him to prosecute and complete the work successfully within the time named. The Owner's decision or judgment on these matters will be final, conclusive, and binding.

The Owner may make such investigations as it deems necessary, and the bidder shall furnish to the Owner, under oath if so required, all such information and data for this purpose as the Owner may request.

7. Conditions of Work

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

8. Addenda and Interpretations

No interpretation of the meaning of the plans, specifications or other prebid documents will be made to any bidder orally. All information given to bidders other than by means of the plans, specifications, or by addenda, as described below, is given informally and shall not be used as the basis of a claim against the Owner.

Every request for such interpretation must be submitted in writing at least 72 business hours before the bid opening and addressed to the following:

Peter Spanos, P.E. Title: Sr. Project Manager Email: ps@gainc.com Gale Associates, Inc.	Copy:	Kyle Rowan Sr. Staff Designer kfr@gainc.com Gale Associates, Inc.

Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, when issued, will be emailed to all prospective bidders (at the respective email address furnished by them for such purposes). Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Contract Documents.

9. Security for Faithful Performance

Simultaneously with his delivery of the executed Contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor and materials under this contract. The surety on such bond or bonds shall be a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Owner. The bonds shall remain in force for one year after final acceptance of the work by the Owner, unless the Owner, in writing, releases the Contractor from the obligation sooner.

10. Power of Attorney

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

11. Laws and Regulations

The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances or bylaws, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the Contract the same as though written out in full.

12. Liquidated Damages for Failure to Enter into Contract

The successful bidder, upon his failure or refusal to execute and deliver the Contract and bonds required within 10 days after presentation thereof by the Owner, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his/her bid, but the amount forfeited shall not exceed the difference between his/her bid price and the bid price of the next lowest responsible and eligible bidder. In case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other similar unforeseen circumstances affecting the bidder, his/her bid deposit will be returned.

13. Obligation of Bidder

At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Contract Documents (including all addenda). The failure or omission of any bidder to examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect of his bid.

14. Information Not Guaranteed

All information given in the Contract Documents relating to subsurface and other conditions, natural phenomena, existing pipes, and other structures is from the best sources at present available to the Owner. All such information is furnished only for the information and convenience of bidders and is not guaranteed.

It is agreed and understood that the Owner does not warrant or guarantee that the subsurface or other conditions, natural phenomena, existing pipes, or other structures encountered during construction will be the same as those indicated in the Contract Documents. It is further agreed and understood that no bidder or Contractor shall use or be entitled to use any of the information made available to him or obtained in any examination made by him in any manner as a basis of or ground for any claim or demand against the Owner or the Architect/Engineer, arising from or by reason of any variance which may exist between the information made available and the actual subsurface or other structures actually encountered during the construction work, except as may otherwise be expressly provided for in the Contract Documents.

15. Bid Security

Each bid and sub-bid must be accompanied by bid security in the form of a certified check, a bid bond, cash, or a treasurer's or cashier's check, payable to the Owner, in the amount of five (5) percent of the value of the bid. Such security of general bidders will be returned to all except the three lowest responsible and eligible bidders within five days, Saturdays, Sundays, and legal holidays excluded, after the opening of bids, and the remaining securities will be returned promptly after the Owner and the accepted bidder have executed the Contract, or if no notice of intent to award has been presented to the selected contractor within 30 days, Saturdays, Sundays and holidays excluded, after the date of the opening of bids, upon demand of the bidder at any time thereafter.

16. Right to Reject Bid

The Owner reserves the right to waive any informalities in bids and to reject any and all bids, should the Owner deem it to be in the public interest to do so.

The Owner may also reject bids which in its sole judgment are either incomplete, conditional, obscure or not responsive or which contain additions not called for, erasures not properly initialed, alterations, or similar irregularities.

17. Time for Completion

The successful general bidder must agree to commence work within ten (10) days of the date of the Notice to Proceed and to fully complete the project within the time limit stated in Section 00300, FORM OF GENERAL BID.

18. Comparison of Bids

Bids will be compared on the basis of prices set forth in the bid forms.
In the event that there is a discrepancy between the lump sum or unit prices written in words and figures, the prices written in words will govern.

19. Award of Contract

The Contract will be awarded to "the lowest responsible and eligible bidder" pursuant to General Laws Chapter 30, Section 39M, as amended. Such a bidder shall possess the skill, ability and integrity necessary for the faithful performance of the work, shall be able to furnish labor that can work in harmony with all other elements of labor employed, or to be employed, in the work, and shall otherwise comply with all applicable provisions of law. Contract award shall be subject to availability of an appropriation for funding.

20. Statutes Regulating Competitive Bidding

Any bid which does not comply with the provisions of Massachusetts General Laws Chapter 30, Section 39M, as amended, need not be accepted and the Owner may reject every such bid.

21. Wage Rates

Prevailing Wage Rates as determined by the Commissioner of Department of Labor and Workforce Development under the provision of the Massachusetts General Laws, Chapter 149, Section 26 to 27G, as amended, apply to this project. It is the responsibility of the bidder, before bid opening, to request any additional information on Prevailing Wage Rates for those tradespeople who may be employed for the proposed work under this contract.

22. Contractor Records

The Contractor shall comply with the provisions of Massachusetts General Laws, Chapter 30, Section 39R concerning Contractor records.

23. INSURANCE

The Contractor shall carry and continuously maintain until completion of the Contract, insurance as specified in Agreement and in such form as shall protect him performing work covered by this Contract, and the Town of Wilmington and its employees, agents and officials, from all claims an liability for damages for bodily injury, including accidental death, and for property damage, which may arise from operations under this Contract. The Town shall be named as an additional insured. The Contractor covenants and agrees to hold the Town and its employees, agents and officials harmless from loss or damage due to claims for bodily injury or death and/or property damage arising from, or in connection with, operations under this Contract.

24. PROJECT MANAGER

The Owner may utilize the services of a project manager, whose duties shall be as set forth in an Agreement for Project Manager Services.

25. CORI/SORI

The Owner shall require criminal offender record information ("CORI") and sex offender registry information ("SORI") relating to any worker who is scheduled to work at the School.

SECTION 00300

FORM OF GENERAL BID

Bid of _____ (hereinafter called "Bidder")*

(____) a corporation, organized and existing under the laws of the state of _____

(____) a partnership

(____) a joint venture

(____) an individual
doing business as _____

To the City/Town of _____, Massachusetts (hereinafter called "Owner").

Gentlemen:

A) The undersigned Bidder, in compliance with your invitation for bids for the project known as _____, having examined the plans and specifications and related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the contract documents and the plans and specifications within the time set forth below, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this bid is a part.

The Bidder hereby agrees to commence work on or before the date to be specified in written "Notice to Proceed" of the Owner, and to fully complete the project within _____ consecutive calendar days thereafter. The Bidder further agrees to pay as liquidated damages the sum of ($) Dollars for each consecutive calendar day thereafter that the work is not complete as provided in the contract.

_____

*Specify corporation, partnership or individual as applicable.

B) Bidder acknowledges receipt of and this bid includes the following addenda:

No. _____ Dated:

No. _____ Dated:

No. _____ Dated:

No. _____ Dated:

C) The Bidder agrees to perform the bid work described in the specifications and shown on the plans for the following contract price: $_____ .

The above unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

The Bidder understands that all bids for this project are subject to the applicable bidding laws of the Commonwealth of Massachusetts, including General Laws Chapter 149 and Chapter 30, Section 39M, as amended.

The Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informalities in the bidding.

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

Within 10 days of receipt of the written notice of acceptance of this bid, the Bidder will execute the formal Agreement set forth in Section 00500 CONTRACT.

Bid security is attached in the sum of five percent (5%) of the total bid in accordance with the conditions of Section 00100 INSTRUCTIONS TO BIDDERS. The bid security may become the property of the Owner in the event the contract and bond are not executed within the time set forth above.

The selected Contractor shall furnish a performance bond and a payment bond in an amount at least equal to one hundred percent (100%) of the contract price in accordance with Section 00610 PERFORMANCE BOND, Section 00620 PAYMENT BOND, and as stipulated in the contract.

The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all the requirements of the plans and specifications.

1. Have been in business under present name for ____ years.

2. The names and addresses of all persons interested in the bid (if made by a partnership or corporation) as principals, are as follows:

_____
_____
_____
_____
_____
_____

(attach supplementary list if necessary)

3. The bidder shall indicate a minimum of six (6) tennis and or basketball court projects completed within the past five (5) years of similar character to this scope that he has completed as the general contractor, and give references that will enable the Owner to judge his experience, skill and business standing (add supplementary page if necessary).

Completion Date	Project Name	Contract Amount	Design Engineer	Reference Name	Telephone No.
a.					
b.					
c.					
d.					
e.					
f.					

Bank reference _____

(Name)

_____

(Bank)

_____

(Address)

_____

(Telephone No.)

Pursuant to G.L. c.62C, §49A, I certify hereby in writing, under penalties of perjury, that the within named Bidder/Contractor has complied with all laws of the commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting of child support.

The undersigned Bidder hereby certifies under penalties of perjury, as follows: (1) that he/she is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid 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.

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

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

Respectfully submitted:

Date: _____

By: _____
(Signature)

_____
(Type Name of Bidder)

_____
(Title)

_____
(Business Address)

_____
(City and State)

_____
(Telephone Number

SECTION 00500

AGREEMENT

THIS AGREEMENT, made this _____ day of _____,

20___, by and between the party of the first part, the Town of _____, hereinafter called "OWNER," acting herein through its _____, and the party of the second part, _____ doing business as *(an individual) (a partnership) (a joint venture) (a corporation) located in the *(City) (Town) of _____, County of _____, and State of _____, hereinafter called "CONTRACTOR."

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the project described as follows:
.

hereinafter called the project, for the sum of _____ _____ Dollars ($_____) and all extra work in connection therewith, under the terms as stated in the Contract Documents; and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in Section 00300 FORM OF GENERAL BID, Section 00700 GENERAL CONDITIONS, Section 00750 SUPPLEMENTARY GENERAL CONDITIONS and Section 00800 SUPPLEMENTAL GENERAL CONDITIONS, the plans, which include all maps, plates, blue prints, and the specifications and Contract Documents as prepared by the Owner.

_____

*Strike out inapplicable term.

The CONTRACTOR hereby agrees to commence work under this Contract on or before a date to be specified in written "Notice to Proceed" of the OWNER.

The CONTRACTOR further agrees to fully complete the project within ____ consecutive calendar days of the date of the notice to proceed.

The CONTRACTOR further agrees to pay as liquidated damages the sum of $. for each consecutive calendar day thereafter as provided in the Liquidated Damages Paragraph of Section 00700 GENERAL CONDITIONS.

The goal for minority business enterprise (MBE) participation for this contract is a minimum of _____ percent MBE participation, on the basis of the total dollars paid. The CONTRACTOR agrees to take all affirmative steps necessary to achieve this goal, and shall provide reports documenting the portion of contract and subcontract dollars paid to minority and women-owned businesses, and its efforts to achieve the goals, with each invoice submitted or at such greater intervals as specified by the Owner. The CONTRACTOR shall require similar reports from its subcontractors.

The CONTRACTOR agrees not to discriminate against or exclude any person from participation herein on grounds of race, religion, color, sex, age or national origin; and that it shall take affirmative actions to insure that applicants are employed, and that employees are treated during their employment, without regard to race, religion, color, sex, age, handicapped status, or national origin.

The CONTRACTOR agrees not to participate in or cooperate with an international boycott, as defined in Section 999 (b)(3) and (4) of the Internal Revenue Code of 1954, as amended, or engage in conduct declared to be unlawful by Section 2 of Chapter 151E of the Massachusetts General Laws.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in Section 00700 GENERAL CONDITIONS as amended by the supplementary general conditions, and to make payments on account thereof as provided in Section 00700 GENERAL CONDITIONS.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

AGREED:

Town of _____, Massachusetts
(Owner)

By_____

_____
(Name)

_____
(Title)

_____
(Contractor)

By_____

_____
(Name)

_____
(Title)

_____
(Address)

_____
(City and State)

Approved as to Form:

By_____
(Owner's Counsel)

_____
(Name)

In accordance with M.G.L. C.44, Section 31C, this is to certify that an appropriation in the amount of this contract is available therefor and that the _____ has been authorized to execute the contract and approve all requisitions and change orders.

By_____
(Owner's Accountant)

_____
(Name)

CERTIFICATE OF VOTE
(to be filed if Contractor is a Corporation)

I, _____, hereby certify that I am the duly qualified
(Secretary of the Corporation)

and acting Secretary of _____ and I further certify that a meeting of the
(Name of Corporation)

Directors of said Company, duly called and held on _____, at which
(Date of Meeting)

all Directors were present and voting, the following vote was unanimously passed:

VOTED: To authorize and empower

_____

_____

_____

_____

_____

Anyone acting singly, to execute Forms of General Bid, Contracts or Bonds on behalf of the Corporation.

I further certify that the above vote is still in effect and has not been changed or modified in any respect.

By:_____
(Secretary of Corporation)

A True Copy:

Attest:_____
(Notary Public)

My Commission Expires:_____
(Date)

CERTIFICATIONS REQUIRED BY LAW
FOR PUBLIC CONSTRUCTION CONTRACTS

You must COMPLETE and SIGN the following certifications. You must also print, at the bottom of this page, the name of the contractor for whom these certifications are submitted.

TAX COMPLIANCE

Pursuant to Chapter 62C of the Massachusetts General Laws, Section 49A(b), I, the undersigned, authorized signatory for the below named contractor, do hereby certify under the pains and penalties of perjury that said contractor has complied with all laws of the Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

NON-COLLUSION

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

PUBLIC CONTRACTOR DEBARMENT

The undersigned certifies under penalty of perjury that the below named contractor is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

OSHA TRAINING

Pursuant to G.L. c. 30, §39S, the Contractor hereby certifies under penalties of perjury as follows:

(1) Contractor is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work;
(2) 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 they shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and
(3) All employees to be employed in the work subject to this contract 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.

COMPLETE AND SIGN BELOW:

_____ _____
Authorized Person's Signature Date

_____
Print Name & Title of Signatory

_____
Name of Contractor

SECTION 00610

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____
(Name of Contractor)

a _____ hereinafter called "Principal" and
(Corporation, Partnership, Joint Venture or Individual)

_____of _____, State of _____
(Surety) (City & State)

_____ hereinafter called the "Surety" and licensed by the State Division of Insurance to do business under the laws of the Commonwealth of Massachusetts, are held and firmly bound to the City/Town of _____, Massachusetts, hereinafter called "Owner", in the penal sum of
_____ Dollars
($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____, 20___ (the "Construction Contract"), for the construction described as follows: _____
_____.

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

PROVIDED, FURTHER, that the Surety's obligation under this Bond shall arise after (1) the Owner has declared the Principal in default of the Construction Contract or any provision thereof or (2) has declared that the Principal has failed, or is otherwise unable or unwilling, to execute the work consistent with, and in conformance to, the Construction Contract (collectively referred to as a "Contractor Default"). The determination of a Contractor Default shall be made solely by the Owner. The Owner need not terminate the Construction Contract to declare a Contractor Default or to invoke its rights under this Bond.

When the Surety's obligation under this Bond arises, the Surety, at its sole expense and at the consent and election of the Owner, shall promptly take one of the following steps: (1) arrange for the Principal to perform and complete the work of the Construction Contract: (2) arrange for a contractor other than the Principal to perform and complete the work of the Construction Contract; (3) reimburse the Owner, in a manner and at such time as the Owner shall decide, for all costs and expenses incurred by the Owner in performing and completing the work of the Construction Contract. Surety will keep Owner reasonably informed of the progress, status and results of any investigation of any claim of the Owner.

If the Surety does not proceed as provided in this Bond with due diligence and all deliberate speed, the Surety shall be deemed to be in default of this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner.

After the Surety's obligation under this Bond arises, the Surety is obligated, to the limit of the amounts of this Bond, for (1) the correction of defective work and completion of the Construction Contract; (2) additional design, professional services, and legal costs, including attorneys' fees, resulting from the Contractor Default or from the default of the Surety under this Bond; (3) any additional work beyond the Construction Contract made necessary by the Contractor Default or default of the Surety under this Bond; (4) indemnification obligation of the Principal, if any, as provided in the Construction Contract; and (5) liquidated damages as provided in the Construction Contract, or if none are so specified, actual and foreseeable consequential damages resulting from the Contractor Default or default of the Surety under this Bond.

Any proceeding, legal or equitable, under this Bond shall be instituted in any court of competent jurisdiction in the Commonwealth of Massachusetts.

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

IN WITNESS WHEREOF, this instrument is executed in _____ ( ) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20___.

ATTEST:

_____
Principal

_____ By _____
(Principal Secretary)

_____

_____

_____
(Address-Zip Code)

_____ (SEAL)
Witness as to Principal

_____

_____
(Address-Zip Code)

ATTEST:

_____
Surety

_____ By _____
(Attorney-in-Fact)

_____

_____
(Address-Zip Code)

_____ (SEAL)
Witness as to Surety

_____

_____
(Address-Zip Code)

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

SECTION 00620

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____

_____ a_____ _____
(Name of Contractor) (Corporation, Partnership, Joint Venture or Individual)

hereinafter called "Principal" and _____ of _____,
(Surety)

State of _____ hereinafter called the “Surety” and licensed by the State
(City and State)

Division of Insurance to do business under the laws of the Commonwealth of Massachusetts, are held and firmly bound to the City/Town of _____, Massachusetts, hereinafter called "Owner", in the penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____, 20___, for the construction described as follows:

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

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

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

IN WITNESS WHEREOF, this instrument is executed in ____ ( ) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20__.

ATTEST:

_____
Surety

_____ By _____
(Attorney-in-Fact)

_____

_____
(Address-Zip Code)

_____ (SEAL)
Witness as to Surety

_____

_____
(Address-Zip Code)

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

SECTION 00700

GENERAL CONDITIONS

Insert EJCDC No. C-700 (2007 edition)

SECTION 00800

SUPPLEMENTAL CONDITIONS

Page

AMENDING THE STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT PREPARED BY ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE
(EJCDC NO. C-700, 2007 EDITION)

(Sub) Paragraph No.	
2.01B	Delete this paragraph and substitute the following: Before any Work at the Site is started, CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which OWNER or any additional insured may reasonably request) which CONTRACTOR is required to purchase and maintain in accordance with Article 5.
2.03	Delete the last sentence.
3.02A.1	Delete the phrase starting "shall mean" through the end of this sentence and substitute the following: shall mean the standard, specification, manual, code, or Laws or Regulations in effect and applicable at the time in question, except as may be otherwise specifically stated in the Contract Documents.
3.03A.3	Delete this paragraph and replace with the following: CONTRACTOR shall be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy if CONTRACTOR knew or reasonably should have known thereof.
4.01A	Delete the last sentence.
4.01B	Delete this subparagraph in its entirety.
4.03C.3	Delete this subparagraph in its entirety.
4.04B.2	Delete the phrase "or not shown or indicated with reasonable accuracy" following the word "indicated." Delete the last sentence.
4.06C	Add the following to the first sentence: "unless CONTRACTOR caused or contributed to such Hazardous Environmental Condition."

4.06D Delete the last sentence.

4.06E Delete the last sentence.

4.06F Delete the second sentence.

4.06G Delete this subparagraph in its entirety.

4.06H Delete the last sentence.

5.03B Delete this subparagraph in its entirety.

5.04B.7 Insert the following new subparagraph:

7. “all coverage shall be written on an occurrence basis.

5.06A Delete this subparagraph in its entirety and substitute the following:

Owner may, in its discretion, purchase and maintain property insurance upon the Work at the Site.

5.06B Delete this subparagraph in its entirety.

5.06D Delete this subparagraph in its entirety and substitute the following:

The risk of loss within any identified deductible amount will be borne by CONTRACTOR, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser’s own expense.

5.07A Delete all text after the first sentence.

5.07B Delete this subparagraph in its entirety.

5.07C Delete this subparagraph in its entirety.

5.08 Delete this paragraph in its entirety.

5.09 Delete this paragraph in its entirety.

5.10 Delete this paragraph in its entirety and substitute the following:

OWNER may occupy or use a portion of the Work prior to Substantial Completion.

6.05A	Add the following to the second sentence ", and in accordance with G.L. c.30, §39M."
6.06F	Insert the following at the beginning of this subparagraph: "Except as required by and indicated in the specifications and contract documents pursuant to G.L. c.149, §44F,"
6.07A	Delete the second sentence.
6.09C	Delete the last sentence.
6.13E	Delete the text in parentheses at the end of the first sentence.
6.20A	Delete the parenthetical phrase "(other than the Work itself)."
6.20.A	Change the phrase "negligent act or omission" to "negligent or wrongful act or omission."
7.01.A.2	Delete this subparagraph in its entirety.
7.01.B	Delete the last sentence.
7.02	Delete this paragraph in its entirety.
8.02	Delete the phrase "to whom CONTRACTOR makes no reasonable objection."
8.07	Delete this paragraph in its entirety.
8.09	Insert the following after the first sentence: "However, the OWNER shall have the right to direct the CONTRACTOR to perform the Work according to any sequence schedule set forth in the Contract Documents or established pursuant thereto."
9.02B	Insert the following at the end of this subparagraph: "However, the ENGINEER shall have the right to direct the CONTRACTOR to perform the Work according to any sequence schedule set forth in the Contract Documents or established pursuant thereto."
9.03	Delete the last sentence.
9.04	Delete the last sentence.
9.08C	Delete the final phrase "subject to the provisions of paragraph 10.05."
9.09B	Insert the following after the first sentence:

"However, the ENGINEER shall have the right to direct the CONTRACTOR to perform the Work according to any sequence schedule set forth in the Contract Documents or established pursuant thereto."

10.03A.3 Delete this subparagraph in its entirety.

11.01A.5 Delete subparagraphs a, b, d, e, f, g, and h.

11.02 Delete this paragraph in its entirety.

12.01B.3 Delete the last phrase "(determined as provided in paragraph 12.01.C)."

12.01C.2 Delete this subparagraph in its entirety.

12.03B Delete this subparagraph in its entirety.

12.03F Insert the following new subparagraph:

3. Delays caused by or within the control of the OWNER. In such event, the CONTRACTOR'S sole remedy shall be an extension of the Contract Time. Notwithstanding anything to the contrary in the Contract Documents, Contractor shall not be eligible for any increase in the Contract Price/Sum on account of any delay in the work, no matter by whom such delay is caused, and Contractor shall make no claim for such an increase, whether such claim is styled as a claim for delay damages, acceleration of work, loss of production, or otherwise.

13.01 Delete the word "Prompt" at the beginning of the subparagraph.

13.03F Delete the balance of this subparagraph after the words "CONTRACTOR's expense."

13.04D Delete this subparagraph in its entirety.

13.08 Delete the fourth sentence.

13.09C Delete the second sentence.

14.02A.1 Delete the first phrase prior to the words, "Contractor shall" and substitute in place thereof the following: "On a monthly basis and in accordance with G.L. c.30, §39G,".

14.02A.3 Delete this subparagraph and substitute the following: "Retainage shall be in accordance with G.L. c.30, §39G.

14.02C Delete this subparagraph and substitute the following:

Payment shall be made in accordance with G.L. c.30, §39G.

14.02D.2 Delete the words “immediate” and “promptly”.

14.02D.3 Delete this subparagraph in its entirety.

14.04C Delete the third sentence and substitute the following:

“OWNER shall review the tentative certificate and make written objection to ENGINEER as to any provisions of the certificate or attached list.”

Delete the phrase “within 14 days after submission of the tentative certificate to OWNER” in the fourth sentence. Delete the phrase “within said 14 days” in the fifth sentence.

14.05 Delete the phrase “subject to the following conditions” at the end of the first sentence and delete subparagraphs 1 and 2 in their entirety.

14.07B.1 Delete the phrase “within ten days after receipt of the final Application for Payment,” in the first sentence.

14.07C Delete this subparagraph in its entirety and substitute the following:

Final payment shall be made in accordance with G.L. c.30, §39G.

14.09A.1 Delete this subparagraph in its entirety.

15.01 Delete this subparagraph in its entirety and substitute the following:

OWNER may suspend the work or any portion thereof in accordance with G.L. c.30, §39O.

15.03A Delete from subparagraph 1 the phrase “including fair and reasonable sums for overhead and profit on such Work;” and from subparagraph 2 the phrase “plus fair and reasonable sums for overhead and profit on such expenses”; and delete subparagraphs 3 and 4 in their entirety.

15.04B Delete the last sentence.

§ SC 1.1 INTRODUCTION

The following provisions modify, change, delete from or add to Section 00500 Agreement. Where any Subsection of the Agreement is modified or any Article Paragraph, Subparagraph or Clause thereof is modified or deleted by these Supplemental Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

§ SC 2.1 PREVAILING WAGE

In accordance with General Laws Chapter 149, Section 26 through 27D, the Contractor is obligated to comply with the prevailing wage rates established by the Commissioner of the Department of Labor and Workforce Development for mechanics, apprentices, chauffeurs, teamsters and laborers employed on the Project. The schedule of applicable prevailing wage rates for the Project, together with a Certificate of Compliance therewith, are set forth in Attachment A herein.

§ SC 3.1 CONTRACTOR'S LIABILITY INSURANCE

TOWN OF WILMINGTON

INSURANCE REQUIREMENTS

A. Worker's Compensation and Employers Liability Insurance

Coverage as required by the Worker's Compensation laws of the Commonwealth of Massachusetts, M.G.L. Chapter149, §34A.

B. General Liability

Bodily Injury each occurrence limit	$1,000,000
Bodily Injury aggregated limit	$3,000,000
Property Damage each occurrence limit	$1,000,000
Project Damage aggregated limit	$3,000,000

Coverage must include Premises/Operations, Independent Contractors, Contractual Liability Assumed, Products/Completed Operations, Personal Injury, Pollution Liability, and shall not be subject to any of the specialproperty damage liability exclusions commonly referred to as XCU exclusions.

C. Automobile Liability

Bodily Injury each person limit	$1,000,000
Bodily Injury each occurrence limit	$3,000,000
Property Damage each occurrence limit	$1,000,000
Property Damage aggregated limit	$3,000,000

Coverage must include Owned Vehicles, Leased Vehicles, Hired Vehicles, Non-Owned Vehicles.

D. Umbrella Liability

General aggregate limit	$2,000,000

Products - completed operations aggregate	$2,000,000
Each occurrence limit	$2,000,000

E. Owner's Protective Liability Insurance

The Contractor shall furnish the Certificates of Insurance naming the Town of Wilmington as additionally insured as their interest may appear, and maintain the require insurances through the life of this Contract.

F. General Requirements for All Lines of Insurance to be Furnishing

All policies shall be written so the Town shall be notified of cancellation or addition of "restrictive amendments"by registered mail or by facsimile not later than ten (10) days prior to the effective date of such cancellation or amendment.

If the initial policy/policies expire prior to the completion of the Work, renewal certificates shall be promptly filed with the Town for extension of said coverage. The full cost of insurance and renewing such coverage for additional amounts of time shall be the sole responsibility of the Contractor.

The Contractor shall require that each subcontractor procure, and maintain, until completion of that subcontractor's work, insurance of the types and to the limits set forth in the above sections. All such coverage by subcontractors shall be in favor of the Contractor, and the Town shall be held harmless from liability in all such policies. Use of subcontractor(s) are subject to the specifications herein.

The policies of insurance required by the General Conditions shall include by endorsement all policies listed above in SC 3.1, that the insurer shall waive all rights of Subrogation in favor of the Owner, Engineer, and any other party named in the written contract against whom the insurer must agree to waive rights of subrogation.

SECTION 00850

Incorporation of Applicable Provisions of the Massachusetts General Laws

Certain provisions of the Massachusetts General Laws are applicable to Construction contracts including, but not limited to, those contained in Chapter 30 and Chapter 149. All applicable provisions of the Massachusetts General Laws are incorporated into the Contract as if fully set forth herein, and shall prevail over any conflicting provisions of the General or Supplemental Conditions.

SECTION 00900

SPECIFICATIONS

"ATTACHMENT A"

[Wage Rates]

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

ROSALIN ACOSTA
Secretary
MICHAEL FLANAGAN
Director

Awarding Authority: Wilmington School District

Contract Number: 718290 **City/Town:** WILMINGTON

Description of Work: Tennis Court Reconstruction - Demolition of existing courts. Reconstruction of new tennis and basketball court complex.

Job Location: 298 Shawsheen Avenue, Wilmington, MA

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$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*	12/01/2020	$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*	12/01/2020	$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)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 2*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
	06/01/2022	$38.14	$8.60	$16.06	$0.00	$62.80
	12/01/2022	$38.99	$8.60	$16.06	$0.00	$63.65
	06/01/2023	$39.89	$8.60	$16.06	$0.00	$64.55
	12/01/2023	$40.79	$8.60	$16.06	$0.00	$65.45
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	12/01/2020	$38.10	$12.80	$9.45	$0.00	$60.35
ASPHALT RAKER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 2*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
	06/01/2022	$38.14	$8.60	$16.06	$0.00	$62.80
	12/01/2022	$38.99	$8.60	$16.06	$0.00	$63.65
	06/01/2023	$39.89	$8.60	$16.06	$0.00	$64.55
	12/01/2023	$40.79	$8.60	$16.06	$0.00	$65.45
For apprentice rates see "Apprentice- LABORER"						
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2020	$46.10	$7.07	$17.98	$0.00	$71.15

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2020

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

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (LOWELL)*	02/01/2021	$53.61	$11.39	$21.41	$0.00	$86.41
	08/01/2021	$55.01	$11.39	$21.57	$0.00	$87.97
	02/01/2022	$55.59	$11.39	$21.57	$0.00	$88.55

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.81	$11.39	$21.41	$0.00	$59.61
2	60	$32.17	$11.39	$21.41	$0.00	$64.97
3	70	$37.53	$11.39	$21.41	$0.00	$70.33
4	80	$42.89	$11.39	$21.41	$0.00	$75.69
5	90	$48.25	$11.39	$21.41	$0.00	$81.05

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.51	$11.39	$21.57	$0.00	$60.47
2	60	$33.01	$11.39	$21.57	$0.00	$65.97
3	70	$38.51	$11.39	$21.57	$0.00	$71.47
4	80	$44.01	$11.39	$21.57	$0.00	$76.97
5	90	$49.51	$11.39	$21.57	$0.00	$82.47

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$41.05	$8.60	$17.47	$0.00	$67.12
	06/01/2021	$42.07	$8.60	$17.47	$0.00	$68.14
	12/01/2021	$43.08	$8.60	$17.47	$0.00	$69.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$39.90	$8.60	$17.47	$0.00	$65.97
	06/01/2021	$40.92	$8.60	$17.47	$0.00	$66.99
	12/01/2021	$41.93	$8.60	$17.47	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$39.90	$8.60	$17.47	$0.00	$65.97
	06/01/2021	$40.92	$8.60	$17.47	$0.00	$66.99
	12/01/2021	$41.93	$8.60	$17.47	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						

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

Apprentice - *CARPENTER - Zone 2 Eastern MA*

Effective Date - 09/01/2020

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

Effective Date - 03/01/2021

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

Notes:

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

Apprentice to Journeyworker Ratio:1:5

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

All Aspects of New Wood Frame Work

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 04/01/2020

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

Effective Date - 04/01/2021

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

Notes:

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

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (LOWELL)*	01/01/2020	$45.23	$12.75	$22.41	$0.62	$81.01

Apprentice - *CEMENT MASONRY/PLASTERING - Lowell*

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.62	$12.75	$15.41	$0.00	$50.78
2	60	$27.14	$12.75	$17.41	$0.62	$57.92
3	65	$29.40	$12.75	$18.41	$0.62	$61.18
4	70	$31.66	$12.75	$19.41	$0.62	$64.44
5	75	$33.92	$12.75	$20.41	$0.62	$67.70
6	80	$36.18	$12.75	$21.41	$0.62	$70.96
7	90	$40.71	$12.75	$22.41	$0.62	$76.49

Notes:

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

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CHAIN SAW OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$50.98	$13.50	$15.70	$0.00	$80.18
	06/01/2021	$52.08	$13.50	$15.70	$0.00	$81.28
	12/01/2021	$53.23	$13.50	$15.70	$0.00	$82.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$33.00	$13.50	$15.70	$0.00	$62.20
	06/01/2021	$33.75	$13.50	$15.70	$0.00	$62.95
	12/01/2021	$34.54	$13.50	$15.70	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$52.06	$8.25	$22.75	$0.00	$83.06

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2021

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

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 2*	12/01/2020	$40.05	$8.60	$17.32	$0.00	$65.97
	06/01/2021	$41.07	$8.60	$17.32	$0.00	$66.99
	12/01/2021	$42.08	$8.60	$17.32	$0.00	$68.00
	06/01/2022	$43.08	$8.60	$17.32	$0.00	$69.00
	12/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	06/01/2023	$45.08	$8.60	$17.32	$0.00	$71.00
	12/01/2023	$46.33	$8.60	$17.32	$0.00	$72.25
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2020	$41.05	$8.60	$17.32	$0.00	$66.97
	06/01/2021	$42.07	$8.60	$17.32	$0.00	$67.99
	12/01/2021	$43.08	$8.60	$17.32	$0.00	$69.00
	06/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	12/01/2022	$45.08	$8.60	$17.32	$0.00	$71.00
	06/01/2023	$46.08	$8.60	$17.32	$0.00	$72.00
	12/01/2023	$47.33	$8.60	$17.32	$0.00	$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS *LABORERS - ZONE 2*	12/01/2020	$40.80	$8.60	$17.32	$0.00	$66.72
	06/01/2021	$41.82	$8.60	$17.32	$0.00	$67.74
	12/01/2021	$42.83	$8.60	$17.32	$0.00	$68.75
	06/01/2022	$43.83	$8.60	$17.32	$0.00	$69.75
	12/01/2022	$44.83	$8.60	$17.32	$0.00	$70.75
	06/01/2023	$45.83	$8.60	$17.32	$0.00	$71.75
	12/01/2023	$47.08	$8.60	$17.32	$0.00	$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 2*	12/01/2020	$41.05	$8.60	$17.32	$0.00	$66.97
	06/01/2021	$42.07	$8.60	$17.32	$0.00	$67.99
	12/01/2021	$43.08	$8.60	$17.32	$0.00	$69.00
	06/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	12/01/2022	$45.08	$8.60	$17.32	$0.00	$71.00
	06/01/2023	$46.08	$8.60	$17.32	$0.00	$72.00
	12/01/2023	$47.33	$8.60	$17.32	$0.00	$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2020	$40.80	$8.60	$17.32	$0.00	$66.72
	06/01/2021	$41.82	$8.60	$17.32	$0.00	$67.74
	12/01/2021	$42.83	$8.60	$17.32	$0.00	$68.75
	06/01/2022	$43.83	$8.60	$17.32	$0.00	$69.75
	12/01/2022	$44.83	$8.60	$17.32	$0.00	$70.75
	06/01/2023	$45.83	$8.60	$17.32	$0.00	$71.75
	12/01/2023	$47.08	$8.60	$17.32	$0.00	$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 2*	12/01/2020	$40.05	$8.60	$17.32	$0.00	$65.97
	06/01/2021	$41.07	$8.60	$17.32	$0.00	$66.99
	12/01/2021	$42.08	$8.60	$17.32	$0.00	$68.00
	06/01/2022	$43.08	$8.60	$17.32	$0.00	$69.00
	12/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	06/01/2023	$45.08	$8.60	$17.32	$0.00	$71.00
	12/01/2023	$46.33	$8.60	$17.32	$0.00	$72.25
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$68.70	$9.40	$23.12	$0.00	$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 09/01/2020

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

Effective Date - 03/01/2021

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

Notes: :

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

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	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 - 01/01/2021

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

Effective Date - 01/01/2022

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

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

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	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*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2020	$45.23	$13.00	$15.70	$0.00	$73.93
	05/01/2021	$46.38	$13.00	$15.70	$0.00	$75.08
	11/01/2021	$47.38	$13.00	$15.70	$0.00	$76.08
	05/01/2022	$48.53	$13.00	$15.70	$0.00	$77.23
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2020	$46.74	$13.00	$15.70	$0.00	$75.44
	05/01/2021	$47.90	$13.00	$15.70	$0.00	$76.60
	11/01/2021	$48.91	$13.00	$15.70	$0.00	$77.61
	05/01/2022	$50.07	$13.00	$15.70	$0.00	$78.77
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 09/01/2020

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

Effective Date - 03/01/2021

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

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

Apprentice to Journeyworker Ratio:1:1

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 35 Zone 2*

Effective Date - 01/01/2021

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

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 12/01/2020

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

Effective Date - 06/01/2021

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

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	09/01/2020	$54.45	$13.00	$19.73	$0.00	$87.18
	03/01/2021	$55.41	$13.00	$20.01	$0.00	$88.42
	09/01/2021	$56.84	$13.00	$20.06	$0.00	$89.90
	03/01/2022	$58.04	$13.00	$20.09	$0.00	$91.13
	09/01/2022	$59.48	$13.00	$20.13	$0.00	$92.61
	03/01/2023	$60.67	$13.00	$20.17	$0.00	$93.84
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	09/01/2020	$56.44	$11.70	$20.24	$0.00	$88.38
	03/01/2021	$57.94	$11.70	$20.24	$0.00	$89.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	09/01/2020	$56.44	$11.70	$20.24	$0.00	$88.38
	03/01/2021	$57.94	$11.70	$20.24	$0.00	$89.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 2*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
	06/01/2022	$38.14	$8.60	$16.06	$0.00	$62.80
	12/01/2022	$38.99	$8.60	$16.06	$0.00	$63.65
	06/01/2023	$39.89	$8.60	$16.06	$0.00	$64.55
	12/01/2023	$40.79	$8.60	$16.06	$0.00	$65.45
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2020	$49.00	$13.80	$17.14	$0.00	$79.94
	09/01/2021	$51.40	$13.80	$17.14	$0.00	$82.34
	09/01/2022	$53.85	$13.80	$17.14	$0.00	$84.79

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

Effective Date - 09/01/2020

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

Effective Date - 09/01/2021

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

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (LAWRENCE AREA)*	09/16/2020	$44.25	$8.10	$25.10	$0.00	$77.45

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Lawrence*

Effective Date - 09/16/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.55	$8.10	$25.10	$0.00	$59.75
2	70	$30.98	$8.10	$25.10	$0.00	$64.18
3	75	$33.19	$8.10	$25.10	$0.00	$66.39
4	80	$35.40	$8.10	$25.10	$0.00	$68.60
5	85	$37.61	$8.10	$25.10	$0.00	$70.81
6	90	$39.83	$8.10	$25.10	$0.00	$73.03

Notes:
Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 2*

Effective Date - 12/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.80	$8.60	$16.06	$0.00	$45.46
2	70	$24.26	$8.60	$16.06	$0.00	$48.92
3	80	$27.73	$8.60	$16.06	$0.00	$52.39
4	90	$31.19	$8.60	$16.06	$0.00	$55.85

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.35	$8.60	$16.06	$0.00	$46.01
2	70	$24.91	$8.60	$16.06	$0.00	$49.57
3	80	$28.46	$8.60	$16.06	$0.00	$53.12
4	90	$32.02	$8.60	$16.06	$0.00	$56.68

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 2*	12/01/2020	$34.75	$8.60	$16.12	$0.00	$59.47
	06/01/2021	$35.67	$8.60	$16.12	$0.00	$60.39
	12/01/2021	$36.58	$8.60	$16.12	$0.00	$61.30
	06/01/2022	$37.48	$8.60	$16.12	$0.00	$62.20
	12/01/2022	$38.33	$8.60	$16.12	$0.00	$63.05
	06/01/2023	$39.23	$8.60	$16.12	$0.00	$63.95
	12/01/2023	$40.13	$8.60	$16.12	$0.00	$64.85
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MASON TENDER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$42.57	$11.39	$20.14	$0.00	$74.10
	08/01/2021	$43.69	$11.39	$20.30	$0.00	$75.38
	02/01/2022	$44.16	$11.39	$20.30	$0.00	$75.85

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2021

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

Effective Date - 08/01/2021

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

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$55.77	$11.39	$22.08	$0.00	$89.24
	08/01/2021	$57.17	$11.39	$22.24	$0.00	$90.80
	02/01/2022	$57.74	$11.39	$22.24	$0.00	$91.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2021

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

Effective Date - 08/01/2021

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

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2) *MILLWRIGHTS LOCAL 1121 - Zone 2*	01/04/2021	$39.72	$9.40	$20.45	$0.00	$69.57
	01/03/2022	$40.97	$9.40	$20.45	$0.00	$70.82
	01/02/2023	$42.22	$9.40	$20.45	$0.00	$72.07

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 2*

Effective Date - 01/04/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$21.85	$9.40	$5.58	$0.00	$36.83
2	65	$25.82	$9.40	$16.90	$0.00	$52.12
3	75	$29.79	$9.40	$17.92	$0.00	$57.11
4	85	$33.76	$9.40	$18.93	$0.00	$62.09

Effective Date - 01/03/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$22.53	$9.40	$5.58	$0.00	$37.51
2	65	$26.63	$9.40	$16.90	$0.00	$52.93
3	75	$30.73	$9.40	$17.92	$0.00	$58.05
4	85	$34.82	$9.40	$18.93	$0.00	$63.15

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

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$23.20	$13.50	$15.70	$0.00	$52.40
	06/01/2021	$23.75	$13.50	$15.70	$0.00	$52.95
	12/01/2021	$24.33	$13.50	$15.70	$0.00	$53.53
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$27.97	$13.50	$15.70	$0.00	$57.17
	06/01/2021	$28.61	$13.50	$15.70	$0.00	$57.81
	12/01/2021	$29.29	$13.50	$15.70	$0.00	$58.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$52.06	$8.25	$22.75	$0.00	$83.06

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2021

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

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

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

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

Effective Date - 01/01/2021

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

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2021

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

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2021	$41.56	$8.25	$22.75	$0.00	$72.56

* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*

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

Effective Date - 01/01/2021

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

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$39.62	$8.25	$22.75	$0.00	$70.62

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2021

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

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	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"	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2020

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

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

Apprentice to Journeyworker Ratio:1:5

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 09/01/2020

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

Effective Date - 03/01/2021

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

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.

Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	09/01/2020	$58.69	$13.57	$17.26	$0.00	$89.52
	03/01/2021	$60.19	$13.57	$17.26	$0.00	$91.02

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 09/01/2020

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

Effective Date - 03/01/2021

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

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

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	09/01/2020	$56.44	$11.70	$20.24	$0.00	$88.38
	03/01/2021	$57.94	$11.70	$20.24	$0.00	$89.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER *LABORERS - ZONE 2*	12/01/2020	$35.66	$8.60	$16.06	$0.00	$60.32
	06/01/2021	$36.58	$8.60	$16.06	$0.00	$61.24
	12/01/2021	$37.49	$8.60	$16.06	$0.00	$62.15
	06/01/2022	$38.39	$8.60	$16.06	$0.00	$63.05
	12/01/2022	$39.24	$8.60	$16.06	$0.00	$63.90
	06/01/2023	$40.14	$8.60	$16.06	$0.00	$64.80
	12/01/2023	$41.04	$8.60	$16.06	$0.00	$65.70
For apprentice rates see "Apprentice- LABORER"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$33.00	$13.50	$15.70	$0.00	$62.20
	06/01/2021	$33.75	$13.50	$15.70	$0.00	$62.95
	12/01/2021	$34.54	$13.50	$15.70	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS 170 - J.G. MacLellan (Lowell)*	01/01/2021	$25.15	$10.01	$6.35	$0.00	$41.51
	05/01/2021	$25.50	$10.01	$6.35	$0.00	$41.86
	01/01/2022	$25.50	$10.37	$6.35	$0.00	$42.22
	05/01/2022	$25.85	$10.37	$6.35	$0.00	$42.57
	01/01/2023	$25.85	$10.77	$6.35	$0.00	$42.97
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	02/01/2021	$46.60	$12.28	$17.15	$0.00	$76.03
	08/01/2021	$48.03	$12.28	$17.15	$0.00	$77.46
	02/01/2022	$49.46	$12.28	$17.15	$0.00	$78.89

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 33*

Effective Date - 02/01/2021

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

Effective Date - 08/01/2021

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

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

Apprentice to Journeyworker Ratio:**

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2021

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

Effective Date - 08/01/2021

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

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	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*	12/01/2020	$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*	01/01/2021	$61.45	$10.00	$20.75	$0.00	$92.20
	03/01/2021	$62.45	$10.00	$21.25	$0.00	$93.70

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 01/01/2021

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

Effective Date - 03/01/2021

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

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

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	09/01/2020	$40.84	$13.00	$17.53	$0.00	$71.37
	03/01/2021	$42.11	$13.00	$17.88	$0.00	$72.99
	09/01/2021	$43.77	$13.00	$18.00	$0.00	$74.77
	03/01/2022	$45.27	$13.00	$18.12	$0.00	$76.39
	09/01/2022	$46.99	$13.00	$18.24	$0.00	$78.23
	03/01/2023	$48.54	$13.00	$18.37	$0.00	$79.91

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 09/01/2020

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

Effective Date - 03/01/2021

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

Notes:

Apprentice to Journeyworker Ratio:1:1

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 02/01/2021

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

Effective Date - 08/01/2021

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

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$41.30	$8.60	$17.47	$0.00	$67.37
	06/01/2021	$42.32	$8.60	$17.47	$0.00	$68.39
	12/01/2021	$43.33	$8.60	$17.47	$0.00	$69.40
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$40.02	$8.60	$17.47	$0.00	$66.09
	06/01/2021	$41.04	$8.60	$17.47	$0.00	$67.11
	12/01/2021	$42.05	$8.60	$17.47	$0.00	$68.12
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$39.90	$8.60	$17.47	$0.00	$65.97
	06/01/2021	$40.92	$8.60	$17.47	$0.00	$66.99
	12/01/2021	$41.93	$8.60	$17.47	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	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)*	12/01/2020	$52.13	$8.60	$17.92	$0.00	$78.65
	06/01/2021	$53.15	$8.60	$17.92	$0.00	$79.67
	12/01/2021	$54.16	$8.60	$17.92	$0.00	$80.68
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	12/01/2020	$54.13	$8.60	$17.92	$0.00	$80.65
	06/01/2021	$55.15	$8.60	$17.92	$0.00	$81.67
	12/01/2021	$56.16	$8.60	$17.92	$0.00	$82.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	12/01/2020	$44.20	$8.60	$17.92	$0.00	$70.72
	06/01/2021	$45.22	$8.60	$17.92	$0.00	$71.74
	12/01/2021	$46.23	$8.60	$17.92	$0.00	$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	12/01/2020	$46.20	$8.60	$17.92	$0.00	$72.72
	06/01/2021	$47.22	$8.60	$17.92	$0.00	$73.74
	12/01/2021	$48.23	$8.60	$17.92	$0.00	$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	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*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	09/01/2020	$58.69	$13.57	$17.26	$0.00	$89.52
	03/01/2021	$60.19	$13.57	$17.26	$0.00	$91.02
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$29.67	$9.25	$1.89	$0.00	$40.81
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$42.03	$9.25	$10.27	$0.00	$61.55
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$34.62	$9.25	$10.07	$0.00	$53.94
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$27.20	$9.25	$1.82	$0.00	$38.27
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$42.03	$9.25	$14.35	$0.00	$65.63
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$37.09	$9.25	$10.87	$0.00	$57.21

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$27.20	$9.25	$1.82	$0.00	$38.27
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$22.25	$9.25	$1.82	$0.00	$33.32
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$49.45	$9.25	$17.48	$0.00	$76.18

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

Effective Date - 08/30/2020

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

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *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

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.

TECHNICAL SPECIFICATIONS

SECTION 010100 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED SECTIONS

A. Section 01 3114 – Conduct of the Work

B. Section 02 2113 – Existing Conditions

1.3 GENERAL SCOPE OF WORK

A. The Tennis Court Reconstruction Project at Shawsheen Elementary School shall include:

1. The demolition of existing site features to include, but not limited to, the existing tennis and basketball court complex, chain link perimeter fencing, adjacent pedestrian walkways, and other appurtenances as detailed in the Contract Documents.
2. The construction of a bituminous concrete tennis and basketball court complex, including the installation of a subsurface drainage system, basketball goals, tennis nets, new perimeter fencing, and other appurtenances, as detailed in the Contract Documents.
3. Various site improvements to include landscaping, bituminous concrete walkways, and all other requirements, as detailed in the Contract Documents.
4. The restoration of any items damaged or destroyed by encroaching upon areas outside the Project Site.
5. Providing and restoring, where appropriate, all temporary facilities.
6. All other work indicated on the contract plans and/or specifications.

1.4 TIME OF COMPLETION

A. Start construction – July 19, 2021

B. Substantial Completion of Court Complex – September 20, 2021

C. Final Completion of Court Complex – September 30, 2021

D. Prior to construction, the Contractor shall provide a detailed Gantt Chart schedule noting the start and end date of each task to be completed. The schedule shall include submission dates for key product submittals.

1.5 TESTING

A. The Contractor will retain and pay for the services of a certified independent testing laboratory in good standing to perform inspections, tests and other services required by the Specification including the expense of all failed tests, including retests as required to obtain approval. Contractor shall submit testing lab certifications and qualifications to the Owner for approval. However, the Owner shall pay for testing of concrete. The Contractor shall coordinate and schedule concrete testing.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 013114 – CONDUCT OF THE WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED SECTIONS

A. Section 01 0100 – Summary of Work

B. Section 02 2113 – Existing Conditions

1.3 PROJECT MANAGEMENT

A. Adjacent school buildings proximate to the project sites may not be occupied during construction. The Contractor will take all necessary precautions to ensure the public safety and convenience of the occupants during construction. Use of any on-site structures by the Contractor, proximate to the work site as a construction office, will not be allowed unless the Owner gives express written consent.

B. The work must be completed in a continuous uninterrupted operation. The Contractor must use sufficient personnel and adequate equipment to complete all the necessary work requirements within a minimum period of time.

C. Unless specifically authorized by the Owner, in writing, the work must be conducted between the hours of 7:00 A.M. and 6:00 P.M., Monday through Friday. No work is to be done on holidays or Sundays, other than for emergencies or as approved by the Owner. Work may be allowed on Saturdays, provided the Contractor obtains the Owner's written approval at least one week prior to the date of such work.

D. The Contractor is responsible for the security of partially completed work until the Owner accepts the project.

E. There will be no storage of materials, tools, and/or equipment within any of the adjacent buildings. The Owner, in writing, must authorize any storage within the school facilities.

F. Only materials and/or equipment intended and necessary for immediate use will be brought onto the sites. At the end of each workday and at the completion of each phase of work, equipment and leftover or unused materials will be removed from the sites.

1.4 SHUTDOWN OF SERVICES

A. The Contractor's attention is especially called to the fact that the continuous operation of services for the Owner is mandatory. The work cannot result in the shutdown of any major utilities in adjacent facilities without the Owner's consent, in writing. If the Owner will not allow this shutdown, but wants instead a temporary means of supplying said services, the Contractor will supply all labor, materials or whatever may be required to supply said temporary services, at no extra cost to the Owner and in accordance with the state and local regulations on health and safety.

1.5 COORDINATION

A. At the pre-construction conference, the Contractor will submit to the Owner for approval, a detailed project progress schedule showing the sequence of operations. The progress schedule will be in a Gantt chart or CPM format with tasks on the critical path clearly identified. The progress schedule must reflect achievements of the required substantial and final completion dates. The Owner may request a revised progress schedule at any point in the project when the working progress schedule is determined to be out of date. The Owner must approve any changes to this operational plan.

B. The Contractor must retain on the worksites, during the work's progress, a competent, full-time representative, satisfactory to the Owner. This representative will not be changed, except with the consent of the Owner. The representative will be in full charge of the work and all instructions given to this person by the Engineer will be binding.

C. The Contractor must supply to the Owner the home telephone number of responsible persons who may be contacted during non-workhours for emergencies on the Project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 013302 – SUBMITTAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED DOCUMENTS

A. Consult the individual sections of the specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.3 GENERAL PROCEDURES FOR SUBMITTALS

A. Submittal Register: Within seven (7) days of receipt of a Notice to Proceed, the Contractor will furnish to the Engineer a complete listing of all submittals (Shop Drawings, Manufacturer's Data, Samples, etc.) required by these specifications in tabular form. This form will include columns sufficient to manage and track the submission and action for each submission. The Contractor will revise and update this form upon request of the Engineer.

B. Schedule of Values: Within seven (7) days of receipt of a Notice to Proceed, the Contractor will furnish to the Engineer a Schedule of Values for review and approval. The Contractor will revise and update this form upon request of the Engineer.

C. Timeliness: The Contractor will transmit each submittal to the Engineer sufficiently in advance of performing related Work or other applicable activities so that the installation is not 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 to the Engineer in advance of the Work.

D. Sequence: The Contractor will transmit each submittal in a sequence which will not result in the Engineer's approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.

E. Contractor's Review and Approval: Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Engineer. Submittals will be accompanied by a transmittal notice stating name of Project, date of submittal, "To", "From" (Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section, or Drawing No. to which the submittal refers, purpose (first submittal, resubmittal), description, remarks, distribution record, and signature of transmitter.

F. Engineer’s Action: The Engineer will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:

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

2. Final-But-Restricted Release: When marked “Approved As Noted” the Work may proceed provided it complies with the Engineer’ s notations or corrections on the submittal and complies with the requirements of the Contract Documents. Acceptance of the Work will depend on these compliances.

3. Returned for Resubmittal: When marked "Revise and Resubmit" or "Disapproved", the Work covered by the submittal (such as purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised, or a new submittal resubmitted without delay, in accordance with the Engineer's notations stating the reasons for returning the submittal.

G. Processing: All costs for printing, preparing, packaging, submitting, resubmitting, and mailing, or delivering submittals required by this contract will be included in the Contract Sum.

1.4 OR EQUALS

A. Definition: Whenever a specification section names one or more brands for a given item, and the Contractor wishes to submit, for consideration, another brand, the submission will be considered an "or-equal" or a "material substitution". For the purposes of this Contract, the terms "or-equal" and "material substitution" will be considered synonymous.

B. In no case may an item be furnished on the Work other than the item named or described, unless the Engineer, will consider the item equal to the item so named or described.

C. The equality of items offered as "equal" to items named or described will be proved to the satisfaction of the Engineer at the expense of the Contractor submitting the substitution.

D. The Engineer and/or the Owner may require that full size samples of both the specified and proposed products be submitted for review and evaluation. The Contractor will bear full cost for providing, delivering, and disposal of all such samples.

E. The Contractor will assume full responsibility for the performance of any item submitted as an "Or-Equal" and assume the costs of any changes in any Work which may be caused by such substitution.

F. Or Equal Approval Process: On the transmittal, or on a separate sheet attached to the submission, the Contractor will direct attention to any deviations, including minor limitations and variations, from the Contract Documents.

1. The Contractor will submit to the Engineers for consideration of any or-equal substitution a written point-by-point comparison containing the name and full particulars of the proposed product and the product named or described in the Contract Documents.
2. Such submittal will in no event be made later than 10 calendar days prior to the incorporation of the item into the Work. This requirement may be waived by the Engineer upon written request.
3. Upon receipt of a written request for approval of an or-equal substitution, the Engineer will investigate whether the proposed item will be considered equal to the item named or described in the Contract Documents. Upon conclusion of the investigation, the Engineer will promptly advise the Contractor that the item is, or is not, considered acceptable as on Or-Equal substitution. Such written notice must have the concurrence of the Owner.

1.5 SUBMISSION OF SHOP DRAWINGS

A. Shop Drawings will be complete and to scale, giving all information necessary or requested in the individual section of the specifications. They will also show adjoining Work and details of connection thereto.

B. Shop Drawings will be for whole systems. Partial submissions will not be accepted.

C. The Engineer reserves the right to review and approve shop drawings only after approval of related product data and samples.

D. Shop drawings will be properly identified and contain the name of the project, name of the firm submitting the shop drawings, shop drawing number, date of shop drawings and revisions, Contractor's stamp of approval, and sufficient spaces near the title block for the Engineer's stamp.

E. The Contractor will submit to the Engineer legible shop drawings. Shop drawings shall be electronic PDF Format.

F. When the shop drawing is returned by the Engineer with the stamp "Revise and Resubmit", “Submit Specified Items” or "Rejected", the Contractor will correct the original drawing or prepare a new drawing and resubmit to the Engineer for approval. This procedure will be repeated until the Engineer’s approval is obtained.

G. When the shop drawing is returned by the Engineer with the stamp "Approved" or "Make Corrections Noted", the Contractor will provide and distribute the drawing for all Contractors and Subcontractors use.

H. The Contractor will maintain one full set of approved shop drawings at the site. The Contractor will produce a set of coordination drawings before the installation of any electrical work.

I. Changes on the submitted shop drawings that deviate from the Design Drawings must be brought to the Owners and Designers attention in writing prior to review. Changes must be clearly visible on the shop drawings in the form of written notation, ballooning or highlighting the intended change. A written description for the proposed change must also be included and submitted on company letterhead. Changes to drawings and details not submitted in accordance with these requirements will not be recognized as an approved deviation from the Design of Record. Construction repairs, renovations or replacements required as a result of shop drawing and submittal deviations that are not documented in accordance with these requirements are subject to removal and/or replacement by the Contractor, at the sole cost of the Contractor.

1.6 SUBMISSION OF PRODUCT DATA

A. The Contractor will submit Product Data to the Engineer via electronic PDF Format. All such data will be specific, and identification of material or equipment submitted will be clearly marked in ink. Data of general nature will not be accepted.

B. Product Data will be accompanied by a transmittal notice. The Contractor's stamp of approval will appear on the information itself, in a location which will not impair legibility.

C. Product Data returned by the Engineer as "Rejected" will be resubmitted until the Engineers approval is obtained.

D. When the Product Data is acceptable, the Engineer will stamp them "Approved" or "Make Corrections Noted" and return to the Contractor. The Contractor will provide and distribute as may be required to complete the Work.

E. The Contractor will maintain one full set of approved, Product Data at the site.

1.7 SUBMISSION OF SAMPLES

A. Unless otherwise specified in the individual section, the Contractor will submit two (2) specimens of each sample required for submission.

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

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

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

E. If a sample is rejected by the Engineer, a new sample will be resubmitted in the manner specified herein above. This procedure will be repeated until the sample is approved by the Engineer.

F. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the specifications, at no additional cost to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not used)

END OF SECTION

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SECTION 013543 – ENVIROMENTAL PROTECTION PROCEDURES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Furnishing all labor, materials, equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and, as the result, of construction operation under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical or biological elements, or agents, which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.

B. The control of environmental pollution requires consideration of air, water and land, and involves management of runoff, dust, noise and solid waste, as well as other pollutants. Work will include installing, maintaining and removing sedimentation and erosion control components within the Limits of Work.

C. This Section does not address erosion and sedimentation control requirements, which are addressed in Section 31 2500 of these Specifications. The Contractor is responsible for completing a Stormwater Pollution Prevention Plan (SWPPP) and will submit to the Engineer prior to construction commencement.

1.3 SECTION INCLUDES

A. Applicable Regulations

B. Notifications

C. Protection of Groundwater

D. Protection of Streams And Wetlands

E. Protection of Land Resources

F. Protection of Air Quality

G. Maintenance of Pollution Control Facilities During Construction

H. Noise Control

I. Diesel Equipment Emission Controls

J. Spill And Discharge Control

1.4 RELATED SECTIONS

A. Section 01 5000 - TEMPORARY FACILITIES AND CONTROLS:

B. Section 02 4113 – SELECTIVE SITE DEMOLITION:

C. Section 31 1000 - SITE CLEARING:

D. Section 31 2000 - EARTH MOVING:

E. Section 31 2500 - EROSION AND SEDIMENTATION CONTROLS:

1.5 APPLICABLE REGULATIONS

A. The General Contractor will comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.

B. Fines and related costs resulting from failure to provide adequate protection against any environmentally objectionable acts and corrective action to be taken are the obligations of the General Contractor.

1.6 NOTIFICATIONS

A. Engineer may notify the General 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 may notify the General Contractor, in writing, through the Engineer, of any non-compliance with State or local requirements. After receipt of such notice from the Engineer or from the regulatory agency, through the Engineer, the General Contractor will immediately take corrective action. Such notice, when delivered to the General Contractor or his/her authorized representative at the site of the Work, will be deemed sufficient for the purpose. If the General Contractor fails or refuses to comply promptly, the Engineer 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, will be made the subject of a claim for extension of time or for excess costs or damages by the General Contractor, unless it is later determined that the General Contractor was in compliance.

PART 2 - MATERIALS

2.1 WATER

A. Water used for dust control and equipment washes will be clean and free of salt, oil and other injurious materials. The General Contractor will provide all necessary water.

B. ONSITE SPILL KIT

1. The General Contractor will provide the following minimum equipment to be kept

onsite, at all times, during site work activities for any unexpected spills or discharges:

2. Sand, clean fill and absorbent pillows;
3. Four (4) drum drums (55 gallon, U.S. DOT 17-E or 17-H);
4. Shovels; and
5. Steam cleaner for decontamination of tools and equipment.

PART 3 - EXECUTION

3.1 PROTECTION OF GROUNDWATER

3.2 PROTECTION OF STREAMS AND WETLANDS

A. Care will be taken to prevent, or reduce to a minimum, any damage to any wetland from pollution by debris, sediment, or other material. Manipulation of equipment and/or materials in delineated wetland areas is prohibited. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in downstream waters of the state will not be discharged from the Site. Such waters will be collected and disposed of by the General Contractor, in accordance with all applicable Federal, State and local regulations.

3.3 PROTECTION OF LAND RESOURCES

A. Land resources, within the project boundaries and outside the limits of permanent work, will be restored to a condition, after completion of remediation activities that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to Limits of Work areas shown on the Drawing.

B. Outside of the Limits of Work as shown on the Drawing, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. Snow fence or other approved equal will be erected at the “fall line” of the tree canopy, and no vehicles or storage will be permitted within, to prevent damage to trees.

C. The locations of storage and other facilities, required in the performance of the Work, will not be within wetlands or resource areas.

3.4 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 – Maintain all demolition excavations, stockpiles, waste areas and all other work areas within or without the project boundaries free from dust, which could cause the standards for air pollution to be exceeded (MADEP 310 CMR 7.09.-7.10) and, which would cause a hazard or nuisance to others.

C. The General Contractor will provide adequate means for the purpose of preventing dust and odor caused by construction operations throughout the period of the construction contract. If the Designer indicates that the level of dust or odors is unacceptable, the General Contractor will employ measures necessary to reduce dust or odors to an acceptable level.

D. The General Contractor will implement engineering controls (e.g. watering, misting) to control dust whenever required by the Engineer.

3.5 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this Contract, maintain all facilities constructed for pollution, erosion and sedimentation control as long as the operations creating the particular pollutant area being carried out.

3.6 NOISE CONTROL

A. The General Contractor will develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum. Local noise ordinances will govern.

B. The General Contractor will execute construction work by methods and by use of equipment, which will reduce excess noise.

C. Equipment will be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations.

D. The General Contractor will manage vehicular traffic and scheduling to reduce noise.

3.7 DIESEL EQUIPMENT EMISSION CONTROLS

A. All motor vehicles and construction equipment will comply with all pertinent local, state, and federal regulations covering exhaust emission controls and safety.

B. All General Contractor and Subcontractor diesel-powered, non-road construction equipment with engine horsepower (HP) ratings of 50HP and above, which are used on the Project Site, for a period in excess of 30 calendar days over the course of the construction period on the Project Site, will be retrofitted with Emission Control Devices in order to reduce diesel emissions.

C. The reduction of emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment will be accomplished by installing Retrofit Emission Control Devices.

D. Construction will not proceed until the General Contractor has submitted a certified list of the non-road, diesel-powered, construction equipment subject to this specification which are, or will be, retrofitted with emission control devices. The list will include: (1) the equipment number, type, make and General Contractor/Subcontractor name; and (2) the emission control device make, model, and EPA verification number. General Contractors will also submit a receipt or other documentation from a manufacturer or installer that verifies that the appropriate equipment has been installed. The General Contractor will

also identify any vehicles that will use Clean Fuels. Equipment that has been retrofitted with an emission control device will be stenciled, or otherwise clearly marked as "Low Emission Equipment".

E. The General Contractor will submit monthly reports, updating the same information stated in Paragraph D above, including the quantity of Clean Fuel utilized. The addition, or deletion, of non-road diesel equipment will be indicated in the report.

F. The General Contractor will use methods to control nuisance odors associated with diesel emissions from construction equipment including, but not limited to, the following: (1) turning off diesel combustion engines on construction equipment not in active use and on trucks that are idling for five (5) minutes or more; and (2) locating diesel equipment away from the general public and sensitive receptors.

G. All costs associated with implementation of the diesel equipment emissions control will be borne by the respective General Contractor and included in their cost for performing the work of the Contract.

3.8 SPILL AND DISCHARGE CONTROL

A. The General Contractor will provide equipment and personnel to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. The collected spill material will be properly disposed of at the General Contractor's expense.

B. Costs to provide the above spill and discharge control materials will be included in the contract base bid price.

END OF SECTION

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SECTION 015000 – TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 GENERAL REQUIREMENTS

A. The Contractor will be responsible for providing and maintaining all temporary facilities until Substantial Completion. Removal of such, prior to Substantial Completion, must be with the concurrence of the Engineer. The Contractor bears full responsibility for providing any facility removed prior to Substantial Completion

B. Removal of all temporary facilities will be a condition precedent to Substantial Completion unless directed otherwise by the Engineer or specifically noted in the Specifications.

C. The Contractor must comply with all safety laws and regulations of the State of Massachusetts, the United States Government, and local government agencies applicable to Work under this contract. The Contractor's attention is directed to the State Massachusetts, Department of Labor and Industries Regulations.

D. Submittals:

1. Within seven (7) days from a Notice to Proceed, the Contractor will submit for the approval of the Engineer a site layout plan indicating the location of all temporary facilities described within this Specification.
2. Shop drawings showing proposed project sign (if applicable).
3. Manufacturer’s Data for proposed field offices (if applicable).

1.3 FIELD OFFICES

A. A field office is not required for this project.

1.4 TEMPORARY TELEPHONES

A. The Contractor will provide a cell phone on site at all times with the same phone number. This will be the number that the Engineer or Owner may contact in times of emergency.

1.5 TEMPORARY TOILETS

A. The Contractor will provide and service an adequate number of toilet booths, with chemical type toilets.

B. The toilets will be maintained by the Contractor in a clean and orderly condition, in compliance with all local and state health requirements.

C. Under no circumstances will the Contractor's personnel be allowed to use Owner's toilets.

1.6 TEMPORARY CONSTRUCTION FENCE

A. The Contractor will be responsible for providing and maintaining temporary fencing or barricades around the construction site, as may be necessary to ensure the safety of all persons authorized or unauthorized. Such protective measures will be located and constructed as required by local, state and federal ordinances, laws, codes, or regulations and as required by the Engineer or Owner. The contractor will provide at the pre-construction conference a site operation plan that indicates construction entrance, lay down areas, stockpile areas, and construction fencing locations for Owner review.

1.7 TEMPORARY STRUCTURES AND MATERIAL HANDLING

A. The Contractor will provide such storage sheds, temporary buildings or trailers, as required for the performance of the Contract. Subcontractors will provide their own temporary buildings and trailers. The locations of such items are to be approved by the Engineer.

B. Materials will be handled, stored, installed, cleaned and protected in accordance with the best practice in the industry and, except where otherwise specified in the Contract Documents, in accordance with manufacturer's specifications and directions.

C. The Contractor must obtain the permission of the Owner for the use of any storage facilities available on site, but the Owner assumes no responsibility for articles stored.

1.8 HOISTING FACILTIIES

A. Except as otherwise specified, the Contractor will provide, operate, and remove material hoists, cranes and other hoisting, as required for the performance of the Work by all trades. All such hoisting service will be without cost to the Subcontractors.

1.9 TEMPORARY WATER

A. The Contractor may make use of the available water supply at the site for construction purposes, provided the permission of the Owner is obtained beforehand and only as long as the water is metered and paid for by the contractor. If onsite water is not available, the contractor is responsible for supplying temporary water.

B. The Contractor will provide all necessary backflow preventers, piping, and hoses to utilize the available sources of water.

C. The Contractor will provide an adequate supply of cool drinking water, with individual drinking cups, for personnel on the job.

1.10 TEMPORARY ELECTRICITY

A. The Contractor may make use of the electricity as available at the site as long as the electricity is metered and paid for by the contractor, provided that the Contractor will supply proper adapters and extension cords. Power requirements that cannot be met with onsite power will be the responsibility of the Contractor.

1. Where heavy duty electric equipment drawing current in excess of 15 amperes is involved, the Contractor will provide temporary service to supply the power.

2. The temporary electric service will include, but not be limited to, labor, materials and equipment necessary to supply temporary power of adequate capacity for the project.

3. Transformers and meters, when required by the power company, will be furnished by the power company and the Contractor will pay the costs thereof.

B. Temporary electrical Work will be performed under the direct supervision of at least one master electrician, who will be present on the project at all times when such work is being performed.

C. All temporary work will be provided in conformity with the National Electric Code, state and local laws, and the requirements of the power company.

D. Dismantle and completely remove from the project site all temporary electrical facilities, only when the permanent electrical system is operational and accepted by the Engineer.

E. Electrical permits will be the responsibility of the Contractor to obtain.

1.11 WEATHER PROTECTION

A. It is to be specifically understood that the Contractor shall do no work under any conditions deemed unsuitable by the manufacturer of various materials to be installed or the Owner for the execution of the Work. This provision will not constitute any waiver, release, or lessening of the Contractor's obligation to bring the Work to Substantial Completion within the period of time set forth in the Contract Documents.

END OF SECTION

SECTION 017000 – PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED DOCUMENTS

A. Consult the individual sections of the specifications for specific items required under those sections.

1.3 PERMITS

A. The Contractor will coordinate the efforts of all Subcontractors and obtain any final permits that may be required.

1.4 SUBSTANTIAL COMPLETION

A. Prior to requesting Substantial Completion, the Contractor will make a thorough inspection of the Work. During this inspection, the Contractor will prepare a comprehensive list of all items remaining to be completed or corrected. This list will include all remaining Contractor and Subcontractor items to be provided under the Contract Documents.

B. Upon completion of the items, noted on the Contractor's list, the Contractor will notify the Engineer that the Work is Substantially Complete. The Engineer will then conduct a similar thorough inspection. If the Engineer agrees that the Work is Substantially Complete, the Engineer will promptly make a thorough inspection and prepare a punch list, setting forth, in accurate detail, any items on the Contractor's list in additional to items that are not acceptable or incomplete. The Contractor will coordinate all Subcontractors to achieve prompt completion of the punch list.

C. The Contractor will not be relieved of the responsibility to provide Contract items omitted on the Engineer's punch list.

D. If the Engineer determines that the Work is not substantially complete, the Engineer will inform the Contractor of those items that must be completed before the Engineer will prepare a punch list. Upon completion of those items, the Contractor will again request the Engineer to prepare a punch list.

E. When the punch list has been prepared, the Engineer will arrange a meeting with the Contractor and Subcontractors to identify and explain all punch list items and answer questions on work which must be done before final acceptance.

F. The Engineer may revise the punch list, from time to time, to ensure that all items of Work

are properly completed.

G. The Engineer will prepare the Certificate of Substantial Completion.

1.5 RECORD DRAWINGS

A. See Section 01 7123 – Surveys and Record Drawings

1.6 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Consult the individual sections of the specifications for the specific requirements for those sections and for further details and descriptions of the requirements

B. Prior to final payment and completion, the Contractor will provide all Operating Manuals and Maintenance Instructions, as required by the Contract Documents.

C. Operating Instructions and Manuals

1. Subcontractors, installers and suppliers will furnish to the Contractor two (2) sets of operating and maintenance instructions of all equipment furnished and installed by them.

2. The Contractor will collect all of the above instructions, bind them into two (2) complete sets and submit them to the Engineer who will deliver them to the Owner.

3. Submission of operating and maintenance instructions will be a condition precedent to final payment.

D. Instruction of Owner’s Personnel

1. Where specified, in the individual sections of the specifications, the Contractor and Subcontractor will instruct the Owner's personnel at the site in the use and maintenance of equipment installed under the Contract.

2. Submission to the Engineer of a Certificate of Compliance to this requirement, signed by the Contractor and the Owner's Representative, will be a condition precedent to final payment.

1.7 FINAL COMPLETION

A. Full Release of Retainage

1. Upon completion of all work, and after receipt of all appropriate marked up As-Built Drawings, Operating Manuals, Warranties, Guarantees and Spare Parts required by the Contract Documents, the Engineer will prepare the Certificate of Final Completion.

2. The Contractor’s signature on this Certificate will be notarized.

3. The Contractor will provide a final Application for Payment to complement the close-out process.

1.8 Partial Release of Retainage

A. If, within sixty (60) days after Substantial Completion, any of the items on the Engineer's punch list are not complete or if the Contractor has not provided the appropriate marked up As-Built Drawings, Operating Manuals, Warranties, Guarantees, or Spare Parts, the Engineer will assign a monetary value for each incomplete item as well as any other items, and the Engineer will prepare a Certificate for Partial Release of Retainage.

1. If the Engineer is required to prepare a Certificate for Partial Release of Retainage, the Contractor will still complete all remaining Work.
2. The Contractor's signature on this Certificate will be notarized.
3. The Contractor may make a request for additional Releases of Retainage when portions of the Work listed on the Engineer's punch list have been satisfactorily completed. Each request will be accompanied by a new application for payment and a new signed and notarized Certificate for Partial Release of Retainage.
4. Upon completion of all remaining items, the Final Release of Retainage will be processed in accordance with Paragraph A above.

END OF SECTION

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SECTION 017123 – SURVEYS AND RECORD DRAWINGS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RECORD DRAWINGS

A. Prior to final payment, the Contractor will engage a Professional Land Surveyor (PLS) to complete an "on-the ground" detailed survey and provide an as-built plan of all facilities within the limit of work. This includes grading, court layout, fencing, utilities, walkways, and all other related amenities within the project scope. The final submitted as-built will be stamped by a Professional Land Surveyor registered in Massachusetts, demonstrating compliance with all NFHS, USTA, American Sports Builders Association (ASBA), and Americans with Disabilities Act (ADA) requirements for layout, geometry, striping and slope requirements. An electronic version of the as-built plan in AutoCAD 2012 or later format shall be provided. As-Built drawings that consist of the Engineer's electronic design file will not be accepted.

B. Record Drawings will consist of all the Contract Drawings with mark-ups made during construction.

C. From the sets of drawings furnished by the Owner, the Contractor will reserve one (1) set for record purposes.

D. The Contractor will keep their marked-up record set on the site at all times and note on it in colored ink or pencil, neatly and accurately, at the end of each working day, the exact location of their work as actually installed. This will include the location and dimensions of underground and concealed Work and any variations from the Contract Drawings. All changes, including those issued by Addendum, Change Order, or instructions by the Engineer will be recorded. Marked-up record drawings will be prepared for the entire project and include all Work, including, but not limited to:

E. The location of all underground utilities and appurtenances referenced to permanent surface improvements, both horizontally and vertically, at ten-foot (10') intervals and at all changes of direction.

F. The Engineer may periodically inspect the marked-up record drawings at the site. The proper and current maintenance of the information required on these drawings will be a condition precedent to approval of the monthly applications for payment.

G. At Substantial Completion, the Contractor will submit the complete set of marked-up as-built drawings to the Engineer. The Contractor will check all marked-up record drawings prepared by subcontractors and certify, in writing, on the title sheet of the drawings, that they are complete and correct prior to submission to the Engineer.

H. The Engineer will review the marked-up record drawings and verify by letter to the Owner that the Work is complete. The Contractor will incorporate any and all changes into the as-built drawings.

I. The Contractor may make a written request for copies of the completed Record Drawings. The Contractor will reimburse the Owner directly for the cost of printing of any requested Record Drawings.

J. Submission of accurate marked-up record drawings, as-built drawings and their approval by the Engineer will be a condition precedent to final payment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 017419 – CLEANING UP

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED DOCUMENTS

A. Consult the individual sections of the specifications for cleaning of Work installed under those sections.

1.3 CLEANING DURING CONSTRUCTION

A. Conduct cleaning and disposal operations to comply with local ordinances, anti-pollution laws and the Owner.

B. Do not burn or bury rubbish and waste materials on the site.

C. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

D. Do not dispose of wastes into streams or waterways.

E. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

F. Maintain the site free from accumulations of waste, debris and rubbish.

G. Provide on-site containers for collection of waste materials and rubbish.

H. At the end of each day, remove and legally dispose of waste materials and rubbish from site.

I. Schedule cleaning operations so that dust and other contaminants, resulting from cleaning process, will not fall on wet, newly applied surfaces.

J. Disposal of materials will be in compliance with all applicable laws, ordinances, codes and by-laws.

1.4 FINAL CLEANING

A. Prior to submitting a request to the Engineer to certify Substantial Completion of the Work, the Contractor will inspect all spaces and verify that all waste materials, rubbish, tools, equipment, machinery and surplus materials have been removed, and that all sight-exposed surfaces are clean. Leave the Project clean and ready for occupancy.

B. Unless otherwise specified under other sections of the Specifications, the Contractor will perform final cleaning operations as herein specified prior to final inspection.

C. Cleaning will include all surfaces which Contractor has had access to, whether new or existing.

D. Employ experienced workmen or professional cleaners for final cleaning.

E. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.

F. Use cleaning materials which will not create a hazard to health or property and will not damage surfaces.

G. Remove grease, mastic, adhesive, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed surfaces. This includes cleaning of the Work of all finishing trades where needed, whether or not cleaning by such trades is included in their respective specifications.

H. Repair, patch and touch up marred surfaces to the specified finish, to match adjacent surfaces.

I. In cleaning items with manufacturer's finish, or items previously finished by a Subcontractor, care will be taken not to damage such manufacturer's or Subcontractor's finish. Any damage to finishes caused by cleaning operations will be repaired at the Contractor's expense.

J. Broom clean exposed concrete surfaces and paved surfaces. Rake clean other surfaces of grounds.

K. The Owner’s responsibility for cleaning commences at Substantial Completion and transfer of occupancy from the Contractor to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 017600 – PROTECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 PROTECTION OF PERSONS & PROPERTIES

A. All Owner facilities may be occupied during construction. The Contractor will take all necessary precautions to ensure public safety and convenience of the occupants during construction

B. Any damage to buildings, roads, (public and private), bituminous concrete areas, fences, lawn areas, trees, shrubbery, poles, underground utilities, etc. will be made good by and at the Contractor's own expense, all to the satisfaction of the Owner.

C. The Contractor will patch, repair and/or replace all adjacent materials and surfaces damaged after the installation of new work, at no expense to the Owner. All repair and replacement work will match the existing in kind and appearance.

1.3 TEMPORARY PROTECTION

A. The Contractor Will:

B. Protect all existing vegetation to remain that is in proximity to the site work required for completion of the construction project.

C. Protect the private property of the Owner. Any areas damaged by the Contractor will be restored to the original condition or compensated at the Contractor's expense.

D. After the installation of the Work by any Subcontractor is completed, the Contractor will be responsible for its protection and for repairing, replacing or cleaning any such Work, which has been damaged by other trades or by any other cause, so that all Work is in first class condition at the time of Substantial Completion.

1.4 ACCESS

A. The Contractor will, at all times, leave an unobstructed way along walks, parking lots and roadways outside the indicated limit of work and will maintain barriers and lights for the protection of all persons and property in all locations where materials are stored or work is in progress.

1.5 SECURITY

A. The Contractor will be responsible for providing all security precautions necessary to protect the Contractor's and Owner's interests.

B. Where excavation is involved, the Contractor will be responsible for providing continuous watchmen service, as necessary, to insure adequate protection of the general public.

1.6 NOISE AND DUST CONTROL

A. The Contractor will take special measures to protect the neighbors and general public from noise, dust and other disturbances, as needed, and/or directed by the Owner throughout construction by:

1. Keeping common pedestrian and vehicular circulation areas clean and unobstructed
2. Applying water or other dust palliatives, as needed, for dust mitigation.
3. Keeping all loose trash picked up and preventing it from blowing outside the limit or work.

1.7 FIRE PROTECTION

A. The Contractor will take necessary precautions to insure against fire during construction. The Contractor will be responsible to ensure that the area within contract limits is kept orderly and clean and all combustible rubbish and construction debris is promptly removed from the site.

B. Installation of equipment suitable for fire protection will be done as soon as possible after commencement of the Work.

1.8 WIND PROTECTION

A. Should high wind or severe weather warnings be issued by the U.S. Weather Bureau, the Contractor will take every precaution to minimize danger to persons, to the Work and to the adjacent property.

1.9 WEATHER PROTECTION

A. The Contractor will provide Weather Protection, as required by Specification Section 01 5000, Temporary Facilities and any other specific requirements of the Contract Documents.

1.10 COORDINATION - NOTIFICATIONS

A. The Contractor will coordinate all work activities with the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 022113 – EXISTING CONDITIONS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED SECTIONS

A. Section 01 0100 – Summary of Work

B. Section 01 3114 – Conduct of the Work

1.3 EXISTING CONDITIONS

A. Before submitting a bid, the Contractor will make a thorough examination of the conditions at the site, checking the requirements of the Plans and Specifications with the existing conditions.

B. No claim for extra compensation or extension of time will be allowed on account of the Contractor's failure to estimate properly the quantities, locations and measurements of all items required to complete the work, which could be discerned from visiting the site and a thorough review of the Bid Documents, Drawings and Specifications.

C. The Contractor will report any discrepancies to the Engineer and request an interpretation prior to bid submission. Discrepancies discovered after award of Contract will be handled as detailed in the General Conditions.

D. The Specifications include a Soils Boring Log provided for information only. The Contractor shall remove all topsoil and organic material from beneath areas to receive pavements, and structures. The Contractor assumes any risk associated with conclusions drawn from this information. If additional investigation is required, the Contractor shall contact the Engineer to obtain permission to perform site investigations prior to start of construction.

E. Existing Utilities exist on site and are shown on the drawings for reference only. Locations shown do not relieve the Contractor from the responsibility for accurately locating and protecting utilities in place. The Contractor is responsible for repair and replacement of all utilities to remain that are damaged by his work.

1.4 SUBMITTALS

A. The Contractor will submit a field verification plan of all utilities within limit of work and submit to Engineer for review and approval.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 023000 – SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 SUBSURFACE INVESTIGATION

A. Information Not Guaranteed: Information on the Drawings and in the Project, Manual relating to subsurface conditions, natural phenomena, and existing utilities and structures is from the best sources presently available. Such information is furnished only for the information and convenience of the Contractor, and the accuracy or completeness of this information is not guaranteed. The Contractor shall field verify and locate existing utilities prior to construction. The Contractor shall utilize a third-party utility locator as necessary. The Contractor shall coordinate with DIG SAFE (811-DIG-SAFE) at least 72-hours prior to excavation.

B. The Contractor may refer to the Soil Boring Logs in the Appendices.

1.3 CONFIRMATION OF GRADES AND UTILITIES

A. Prior to commencement of site excavating operations, the Contractor shall compare existing site grading and proposed new site grading. Where existing utilities are indicated but their inverts or depths are not, exploratory excavating shall be performed to assure that sufficient earth coverage will be attained during the course of new site grading.

1. Utilities existing on the site shall be carefully protected from damage and relocated or removed as required by the work. When an active utility line is exposed during construction, its location and elevation shall be plotted on the record drawings and the Engineer, and the utility Owner notified in writing.

2. If exploratory excavating confirms that the depth of existing utilities will be negatively impacted by proposed new grades (i.e., will be too shallow or become exposed), immediately notify the Engineer. Do not proceed with work in such areas until instructions are issued by the Engineer. Continue work in other areas.

1.4 CONFIRMATION OF INTEGRITY OF ADJACENT STRUCTURES

A. Prior to commencement of site excavating operations, the Contractor shall compare depths of existing structures and proposed depths of new utilities. Where existing structures are indicated but their depths are not, exploratory excavating shall be performed to assure that proposed new excavations adjacent to them, or in near proximity of them, will not undermine the structural integrity of the existing structures. The Contractor shall be responsible for providing shoring as necessary to protect existing site appurtenances.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 024113 – SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Work to include the demolition of indicated existing utilities, drainage structures, fencing, fencing foundations, sports equipment, sports equipment foundations, bituminous concrete pavement, topsoil and grass.

B. Except for items or materials indicated to be reused, salvaged, reinstalled or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option and in full compliance with all applicable disposal regulations.

1.3 DESCRIPTION OF WORK

A. Work Included:

1. Demolition and removal of selected site elements as required for new work. Refer to the Drawings for additional requirements.

2. Salvage of existing items to be reused or turned over to the Owner.

3. Removal and legal disposal of demolished materials off site. Except those items specifically designated to be relocated, reused, or turned over to the owner, all existing removed materials, items, trash, unsuitable soils, stumps and debris shall become property of the Contractor and shall be completely removed from the site and legally disposed of at her/his expense. Salvage value belongs to the Contractor. On-site sale of materials is not permitted.

4. Demolition and removal work shall properly prepare for alteration work and new construction to be provided under the Contract.

5. Scheduling and sequencing operations without interrupting utilities serving occupied areas. If interruption is required, obtain written permission from the utility company. Provide temporary services as necessary to serve occupied and usable facilities when permanent utilities must be interrupted, and schedule interruption when the least amount of inconvenience will result.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 01 5000 - TEMPORARY FACILITIES: Maintenance of access, cleaning during construction, dust and noise control.

1.4 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to the Owner ready for reuse, at a location designated by the Owner. Protect from weather until accepted by Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated. Protect from weather until reinstallation.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.5 MATERIALS OWNERSHIP

A. Where indicated on plan, Historic items, relics, and similar objects including, but not limited to, ornamental signage, metalwork, cornerstones and their contents, commemorative plaques, antiques, and other items of interest or value that may be encountered during demolition shall remain property of the Owner as applicable. Carefully remove each item or object in a manner to prevent damage and deliver promptly to a location acceptable to the Owner.

B. Excess topsoil: Refer to Site Clearing 31 1000.

C. Except for materials indicated to be stockpiled, reused, or to remain as the Owner's property, cleared materials shall become the Contractor's property and shall be removed from the site.

1.6 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with early and late starting and finishing dates for each activity. Ensure Owner's on-site operations are uninterrupted if applicable.

2. Coordination of Owner's continuing occupancy of portions of existing site.

3. Means of protection for items to remain and items in path of removal.

B. Submit photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations. Submit photographs of existing items to be removed and reinstalled to record original condition of objects to be retained.

1.7 RECORD DRAWINGS

A. Record drawings at Project Closeout shall be in accordance with Division 1.

B. Identify and accurately locate capped utilities and other subsurface conditions.

1.8 REGULATORY REQUIREMENTS

A. Comply with governing State and EPA notification regulations, before starting selective demolition. Comply with the hauling and disposal regulations of any authorities having jurisdiction.

B. The Owner will occupy portions of the facilities and fields immediately adjacent to selective demolition areas. Conduct selective demolition so that the Owner's operations will not be disrupted. Provide not less than 72 hours of notice to the Owner of activities (if any) that may affect the Owner's operations.

C. The Owner assumes no responsibility for the actual condition of facilities or items to be selectively demolished or removed and reused.

D. Storage or sale of removed items or materials on-site will not be permitted without the Owner’s permission.

1.9 QUALITY ASSURANCE

A. Examination of Existing Conditions: The Contractor shall examine the Contract Drawings for demolition and removal requirements and provisions for new work. Verify all existing conditions and dimensions before commencing work. The Contractor shall visit the site and examine the existing conditions as he finds them and shall inform herself/himself of the character, extent and type of demolition and removal work to be performed. Submit any questions regarding the extent and character of the demolition and removal work in the manner and within the time period established for receipt of such questions during the bidding period.

1.10 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXECUTION

A. Prior to commencing any excavation or demolition, the Contractor shall take all actions necessary to fully protect the existing facilities from damage. The Contractor shall take all actions required to repair any damage and return the fields to their existing

conditions.

B. Survey the condition of the site to determine whether removing any element might result in the undesirable damage of any portion of the adjacent facilities during selective demolition.

C. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Conduct demolition operations and remove debris to ensure minimum interference with roads, parking lots, streets, walks and other adjacent occupied and utilized facilities.

E. Conduct demolition operations to prevent injury to people and damage to adjacent buildings, facilities and site improvements to remain. Ensure safe passage of people around selective demolition areas.

F. Use water mist and other suitable methods, as necessary, to limit the spread of dust and dirt. Comply with governing environmental protection regulations.

G. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

H. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to conditions existing before the start of selective demolition.

I. Demolish and remove existing construction only to the extent required by new construction and as indicated. The Contractor is to be responsible for any cutting and patching that is required.

J. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

K. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

L. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

M. Disposal: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

N. Do not burn demolished materials.

O. Transport demolished materials off the Owner's property and legally dispose of them, if they are not designated for salvage by the Owner or reuse.

P. In areas where bituminous concrete is to be removed, the edge of any bituminous concrete to remain must be a sawcut edge.

Q. Items to be removed and reset may be stored on site, at a location approved by the Owner.

R. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

3.2 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 01 5000 - TEMPORARY FACILITIES.

B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area(s).

1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Provide temporary barricades as required to limit access to demolition areas.

2. Protect existing site improvements, appurtenances, and landscaping to remain.

3.3 DISCOVERY OF HAZARDOUS MATERIALS

A. If hazardous materials, such as chemicals, asbestos-containing materials, or other hazardous materials are discovered during the course of the work, cease work in affected area only and immediately notify the Designer of such discovery. Do not proceed with work in such areas until instructions are issued by the Designer. Continue work in other areas.

B. If unmarked containers are discovered during the course of the work, cease work in the affected area only and immediately notify the Designer of such discovery. Do not proceed with work in such areas until instructions are issued by the Designer. Take immediate precautions to prohibit endangering the containers integrity. Continue work in other areas.

3.4 CUTTING

A. Provide a flush saw cut edge where pavement, curb and concrete removals abut new construction work or existing surfaces to remain undisturbed.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Comply with requirements of Section 01 7419 - CLEANING UP and the following.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Burying: Do not bury demolished materials.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Premises shall be left in a clean condition and ready to accept alteration work and new construction.

END OF SECTION

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SECTION 031000 – CONCRETE FORMWORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 03 2000 - Concrete Reinforcement
2. Section 03 3000 - Cast-In-Place Concrete
3. Section 31 2000 - Earth Moving

1.3 WORK INCLUDED

A. The Contractor shall supply all labor, materials, equipment, temporary protection, tools and appliances necessary for the proper completion of the work in this section, as required in the specifications and in accordance with good construction practice. The work under this section generally includes the following:

B. Furnish, erect, and remove after use, all concrete formwork and accessories, as required for cast-in-place concrete work.

1.4 REFERENCES

A. Comply with applicable requirements of the following standards (current edition). Where these standards conflict with other requirements, the most restrictive requirements shall govern.

1. AMERICAN CONCRETE INSTITUTE (ACI)
2. ACI 301 Specifications for Structural Concrete
3. ACI 318/318R Building Code Requirements for Structural Concrete and Commentary
4. ACI 347R Guide to Formwork for Concrete
5. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
6. ASTM C578 Rigid, Cellular Polystyrene Thermal Insulation
7. AMERICAN HARDBOARD ASSOCIATION (AHA)

8. AHA A135.4 Basic Hardboard
9. DEPARTMENT OF COMMERCE (DOC)
10. DOC PS 1 Construction and Industrial Plywood
11. MASSACHUSETTS STATE BUILDING CODE

1.5 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 3302 SUBMITTAL PROCEDURES:

1. Data: Design analysis and calculations for form design and methodology used in the design.
2. Manufacturer's data, including literature describing form materials, accessories, and form releasing agents.
3. Drawings: Drawings showing details of formwork including, joints, supports, studding and shoring and the sequence of form and shoring removal.
4. Instructions: Manufacturer's recommendation on method and rate of application of form releasing agents.

1.6 DESIGN

A. Formwork shall be designed in accordance with methodology of ACI 347R for anticipated loads, lateral pressures and stresses.

B. Forms shall be capable of producing a surface which meets the requirements of the class of finish specified in Section 03 3000 CAST-IN-PLACE CONCRETE.

C. Forms shall be capable of withstanding the pressures resulting from the placement and vibration of concrete, in addition to applicable and anticipated construction loads.

1.7 QUALITY CONTROL

A. Unless otherwise specified herein, or indicated on the drawings, concrete formwork construction and materials shall conform to ACI 301, 318, and 347, and the following tolerances:

TABLE 1: TOLERANCES FOR FORMED SURFACES			
1.	Variations from the plumb.	In any 10 feet of length.	¼ inch
a.	In the lines and surfaces of piers, walls.	Maximum for entire length and in arises.	1 inch
2.	Variation from the level or from the grades indicated on the drawings.	In any 10 feet of length. In any bay or in any 20 feet of length.	¼ inch 3/8 inch

3.	Variation in the thickness of slabs and walls.	Minus. Plus.	¼ inch ½ inch
4.	Footings.		
a.	Variation of dimensions in plan. When formed: When placed against unformed excavation:	 Minus. Plus. Plus.	 ½ inch 2 inches 3 inches
b.	Misplacement of the eccentricity.	2 percent of the footing width in direction of misplacement. But not more than	 2 inches
c.	Reduction in thickness.	Minus.	5 percent of specified thickness

B. The maximum deflection of form facing materials at concrete surfaces exposed to view shall be L/240 of span.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Class A and Class B finished surfaces shall be plywood panels conforming to DOC PS 1, Grade B-B concrete form panels, Class I or II. Other form materials or liners may be used, provided the smoothness and appearance of the concrete produced will be equivalent to that produced by the plywood concrete form panels.

B. Forms for Class C finished surfaces shall be shiplap lumber; plywood conforming to DOC PS 1, Grade B-B concrete form panels, Class I or II; tempered concrete form hardboard, conforming to AHA A135.4; other approved concrete form material; or steel, except that steel lining on wood sheathing shall not be used.

C. Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.

D. Form ties shall be factory-fabricated metal ties, shall be of the removable or internal disconnecting or snap-off type, and shall be of a design that will not permit form deflection and will not spall concrete upon removal. Solid backing shall be provided for each tie. Except where removable tie rods are used, ties shall not leave holes in the concrete surface less than ¼ inch, nor more than 1 inch deep and not more than 1 inch in diameter. Removable tie rods shall not be more than 1-½ inches in diameter.

E. Form releasing agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces, depending upon bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds.

F. Form release agents shall be fully compatible with project specified foundation waterproofing, damp-proofing, vapor barriers and sealants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Forms shall be mortar tight, properly aligned, and adequately supported to produce concrete surfaces meeting the surface requirements specified in Section 03 3000 CAST-IN-PLACE CONCRETE. Forms shall conform to construction tolerances given in TABLE 1, "Tolerances for Formed Surfaces", of this Section, Part 1.

B. Where concrete surfaces are to have a Class A or Class B finish, joints in form panels shall be arranged as approved. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alignment of the surface and to prevent leakage of mortar.

C. Forms shall not be reused if there is any evidence of surface wear and tear, or defects which would impair the quality of the surface. Surfaces of forms to be reused shall be cleaned of mortar from previous concreting and of all other foreign material before reuse.

D. Form ties that are to be completely withdrawn shall be coated with a non-staining bond breaker.

E. Formwork and form ties shall not be placed in a location or manner which would cause interference with or impede the performance of reinforcing, embedded items or water stops.

3.2 CHAMFERING

A. Except as otherwise shown, external corners that will be exposed shall be chamfered, beveled or rounded by moldings placed in the forms.

3.3 COATING

A. Forms for Class A and Class B finished surfaces shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions.

B. Forms for Class C and D finished surfaces may be wet with water, in lieu of coating immediately, before placing concrete; except that in cold weather with probable freezing temperatures, coating shall be mandatory.

C. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be completely removed before placing concrete. Insofar as practical, form release agents shall be applied to form surfaces prior to placing the forms into position.

3.4 REMOVAL OF FORMS

A. Forms shall be removed in a manner that will prevent damage to the concrete and will ensure the complete safety of the structure. Formwork for footings, walls and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation, but not before at least 24 hours has elapsed since concrete placement.

B. Supporting forms and shores shall not be removed from walls until the structural units are strong enough to carry their own weight and any other construction or natural loads.

C. In no case will supporting forms or shores be removed before the concrete strength has reached 70 percent of design strengths, as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens and by a structural analysis, considering the proposed loads in relation to these test strengths and the strength of the forming and shoring system.

D. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they represent.

END OF SECTION

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SECTION 032000 – CONCRETE REINFORCEMENTGENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACT REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

1.2 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 03 1000 – Concrete Formwork

2. Section 03 3000 – Cast-in-Place Concrete

1.3 WORK INCLUDED

A. In general, the Contractor shall supply all labor, materials, equipment, temporary protection, tools and appliances necessary for the proper completion of the work in this section, as required in the specifications and in accordance with good construction practice. The work under this section generally includes the following:

1. Furnish and install reinforcing bars, tie wires and supports, as required.

2. Furnish and install welded wire fabric, as required.

3. All reinforcing must be grounded in accordance with the National Electric Code and MA State Building Code. Coordinate with electrical engineer and contractor.

4. Clean all areas affected by the work.

1.4 REFERENCES

A. Comply with applicable requirements of the following standards (latest edition). Where these standards conflict with other requirements, the most restrictive requirements shall govern.

1. American Concrete Institute Standards (ACI), Latest Edition.

a. 117- Specifications for Tolerances for Concrete Construction and Materials and Commentary

b. 301- Specifications for Structural Concrete

c. 318 - Building Code Requirements for Structural Concrete

d. 315 - Details and Detailing of Concrete Reinforcement.

e. 315R Manual of Engineering and Placing Drawings for Reinforced Concrete Structures

2. American Society for Testing and Materials (ASTM)

a. A615 Deformed and Plain Billet Steel Bars for Concrete Reinforcement

3. Concrete Reinforcing Steel Institute (CRSI)

a. Manual of Standard Practice, Latest Edition

b. Placing Reinforcing Bars, Latest Edition

1.5 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 3302 SUBMITTAL REQUIREMENTS:

B. Shop Drawings:

1. Show sizes and dimensions for fabrication and placing of reinforcing steel and bar supports. Indicate bar schedules, stirrup spacing and diagrams of bent bars, including all accessories.

2. Reinforcement in foundation walls, piers and footings shall be shown in elevation of at least ¼" = 1'-0".

3. Detail reinforcing in accordance with ACI 215.

C. Certificates:

Mill test certificates; identifying the chemical and physical analysis of each load of reinforcing steel delivered.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver reinforcement to project site, in bundles, marked with metal tags indicating bar size and length.

B. Handle and store materials to prevent contamination and contact with the ground. Store reinforcing steel under cover and protect from rusting, oil, grease and/or distortion.

C. Remove from storage only those materials needed for immediate use.

1.7 QUALITY CONTROL

A. Reinforcing steel shall be fabricated to conform to the required shapes, dimensions and tolerances specified in the CRSI Manual.

B. Allowable Tolerances:

1. Fabrication Tolerances: Sheared Length: Plus, or minus 1 inch for bends. Stirrups, ties, and spirals: Plus, or minus ½ inch.

2. Placement Tolerances:

a. When member depth (or thickness) is 4 in. or less: Plus, or minus ¼ in.

b. When member depth (or thickness) is over 4 in. and not over 12 in.: Plus, or minus 3/8 in.

c. When member depth (or thickness) is over 12 in.: Plus, or minus ½ in.

3. Minimum spacing between bars: The greater of the bar diameter or 1 in. for unbundled bars.

4. Top bars in slabs and beams: Members 8 inches deep or less: Plus, or minus ¼ in.; Members between 8 inches and 2 feet: Plus, or minus ½ inch; Members 2 feet deep or greater: Plus, or minus 1 inch.

5. Crosswise of members: Spaced evenly within 2 inches.

6. Lengthwise of members: Plus, or minus 1 inch.

7. Maximum bar movement, to avoid interference with other reinforcing steel, conduits or embedded items: 2 bar diameters.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcing Bars; Ties and Stirrups:

1. Deformed billet steel: ASTM A615, Grade 60.

2. Bend test: Meet 90° bend test at 60° F minimum temperature, around a 10-bar diameter bend, without cracking.

B. Welded Wire Mesh:

1. Size per plans, conform to ASTM A884, Epoxy Coated.

2. All welded wire mesh to be provided in flat sheets.

3. All supplied welded wire mesh shall meet the current test criteria from the following four (4) ASTM Standards: A82, A496, A185 and A497.

C. Tie Wire:

1. Annealed Steel - Federal Specification QQ-W-461, 16 gage minimum.

D. Bar Supports; Accessories:

1. Conform to "Bar Support Specifications", CRSI Manual of Standard

2. Practice, Class B – Pre-galvanized Cold-Drawn Wire.

3. All necessary spacers, ties, chains, bolsters and other devices required to properly support and fasten reinforcing shall be galvanized or plastic, in accordance with ACI 315. Legs or other parts in contact with forms of exposed surfaces shall be plastic coated.

2.2 FABRICATION

A. In accordance with CRSI Manual of Standard Practice.

B. Fabricate and mark reinforcing bars, in accordance with ACI 315 and ACI 318.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove all mud, oil, loose rust or mill scale and other foreign materials that may reduce bond prior to placing concrete. "Tight" rust or mill scale will be permissible without cleaning or brushing, provided weights and dimensions are not less than the minimum required by referenced specifications.

B. Form oils shall be placed prior to erecting around reinforcement; or, if applied in the vicinity of reinforcement, adequate masking shall be temporarily placed to avoid coating the reinforcing steel with form release agents.

C. All bars shall be cold bent to the required shapes before they are placed in the forms. Reinforcement shall not be straightened or re-bent in a manner that will injure, damage or weaken the material.

D. Bars with kinks or bends not required shall not be used.

3.2 INSTALLATION

A. Reinforcing Bar Placement:

1. Conform to CRSI-WCRSI, "Placing Reinforcing Steel".

2. Position bars in accordance with above tolerances and secure in place.

3. All rods shall be securely wired together at all intersections.

4. Where continuous bars are called for, they shall be run continuously around corners and lapped at necessary splices or booked at discontinuous ends. Laps shall be forty (40) bar diameters, unless otherwise shown.

B. Notify the Engineer for inspection of the completed installation of reinforcement at least forty-eight (48) hours prior to the scheduled placement of concrete

C. Welded Wire Mesh Placement:

1. Install in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

2. Mesh shall be wired or clipped together at laps, at intervals not to exceed 4 feet. Mesh shall be positioned by the use of appropriate supports suitable for application.

3. Welded wire mesh must be adequately supported and placed 2” below the top surface of the slab. Mesh shall lap 6” minimum, or one space, whichever is larger.

4. Maximum space between chair supports for mesh shall be 18” in each direction.

D. Bar Supports:

1. Provide minimum number of supports, as required by ACI 315.

2. Do not use pebbles, pieces of broken stone, brick, concrete, metal pipe or wood blocks to support reinforcement. Do not use bar supports as support for runways for concrete buggies or similar loads. Do not place bars more than 2 inches beyond the last leg at the end of a run of continuous supports.

3. All reinforcement shall be securely held in place with approved supporting, spacing and tying devices. Concrete supports require the Engineer’s approval.

4. Maximum space between bar supports shall be 24” in each direction.

E. Concrete Cover:

1. Except as otherwise indicated on the construction drawings; provide the minimum clearance for concrete cover, in accordance with ACI 318.

F. Reinforcing Adjustment:

1. Move only within allowable tolerances to avoid interference with other reinforcing steel, conduits or embedded items. Do not move bars beyond allowable tolerance without approval of the Engineer.

2. Do not heat, bend or cut bars without the approval of the Engineer.

G. Splices:

1. Do not splice bars, except at locations on the details, without the approval of the Engineer.

2. Minimum lap distance is as shown on the details and as specified in ACI 318. Tie splices securely with wire to prevent displacement during the placing of concrete.

END OF SECTION

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SECTION 033000 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 RELATED REQUIREMENTS

A. Section 03 10 00 – Concrete Formwork

B. Section 03 20 00 – Concrete Reinforcement

1.3 SCOPE OF WORK

A. In general, the Contractor shall supply all labor, materials, equipment, temporary protection, tools and appliances necessary for the proper completion of the work in this section, as required in the specifications and in accordance with good construction practice. The work under this Section includes cast-in-place concrete as shown on the contract documents.

B. Clean all areas affected by the work to the satisfaction of the Owner.

1.4 JOB CONDITIONS

A. The Contractor shall provide all protection, barriers, and guards necessary to segregate his work area and the areas below, from pedestrian and vehicular traffic. Also protect existing buildings, landscaping and paved areas from damage.

B. The Contractor shall be responsible for securing and protecting his/her equipment, materials and tools (as well as partially completed construction) from wind blow-off and vandalism or abuse.

C. Environmental Requirements: Do not place concrete during rain, sleet or snow unless adequate protection is provided, and the Engineer's approval is obtained. Do not allow rainwater to increase the mixing water or damage the surface finish.

D. Cold Weather Concreting:
   1. Conform to ACI 306 latest edition, "Recommended Practice for Cold Weather Concreting."
   2. Temperature of concrete when placed shall not be less than the following:

Minimum Concrete Temperature °F
Sections with Least Dimension

Air Temp (°F)	Under 12"	12" and Over
30 to 45	60	50
0 to 30	65	55
Below 0	70	60

3. When placed, heated concrete shall not be warmer than 80° F.
4. Prior to placing concrete, all ice, snow, and surface and subsurface frost shall be removed, and the temperature of the surfaces to be in contact with the new concrete shall be raised to the temperature specified above for placing.
5. Protect the concrete from freezing for four (4) days after placement.
6. Heated enclosures shall be strong and windproof to ensure adequate protection of corners, edges and thin sections. Do not permit heating units to locally heat or dry the concrete. Do not use combustion heaters during the first 24 hours unless the concrete is protected from exposure to exhaust gases which contain carbon dioxide.
7. When air temperature gets below 25 degrees F, two (2) additional ASTM C39 cylinders shall be made and located at the site in a location and under conditions which will match the placement that they represent. After seven (7) days of site conditions, the cylinders shall be placed in a steam room for twenty-one (21) days.

E. Hot Weather Concreting:
1. Conform to ACI 305 latest edition, "Recommended Practice for Hot Weather Concreting." Take precautions when the ambient air temperature is 90° or above. Temperature of the concrete when placed shall not exceed 80° F. Cool forms and reinforcing to a maximum of 90° F by spraying with water prior to placing concrete. Do not use cement that has reached temperatures in excess of 170° F.

F. Prevent plastic shrinkage cracking due to rapid evaporation of moisture. Do not place concrete when the evaporation rate (actual or anticipated) equals or exceeds 0.20 pounds per square foot per hour, as determined by Figure 2.1.4 of ACI 305.
1. Set-retarding admixtures may be used with Engineer's approval when the ambient air temperature is 90° F or above to off-set the accelerating effects of high temperatures.

1.5 QUALITY ASSURANCE

A. Reference Standards: Except as modified or supplemented herein, all concrete materials, placing, furnishing, curing and all other appurtenant work shall meet the requirements of the latest edition of the following Standard Specifications. Pertinent portions of the reference standards are included herein. Refer to the standards for detailed requirements.
1. AMERICAN CONCRETE INSTITUTE STANDARDS (ACI)
a. 301 - Standard Specifications for Structural Concrete for Buildings.

b. 304 - Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.

c. 316 - Building Code Requirements for Reinforced Concrete

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. ATMS C109 "Test Method for Compressive Strength of Hydraulic Cement Mortars"

1.6 SUBMITTALS

A. Refer to Section 01 3302 - Submittals. Supplement with the following:

B. Test Reports: Perform and submit test reports for the following products in accordance with above general reference standards and specific standards set forth hereafter.

C. Proposed Mix Design:

1. Prior to commencing concrete work submit and obtain Engineer's approval of certified test report describing proposed concrete mix design, including:

a. Fine Aggregates - Source, type, gradation, deleterious substances and saturated surface dry specific gravity (ASTM C128).

b. Coarse Aggregates - Source, type, gradation, deleterious substances and saturated surface dry specific gravity (ASTM C127); soundness (ASTM C88).

c. Ratio of fine to total aggregates.

d. Weight (surface dry) of each aggregate per cubic yard.

e. Total water content (gallons) per cubic yard, water/cementitious materials ratio and proposed source.

f. Slump on which design is based, ASTM C143.

g. Brand, type and quantity of cement.

h. 7-day and 28-day compressive strength results from each of two sets of test cylinders for each proposed mix.

i. Air Content, ASTM C231 or ASTM C173.

j. Certifications of Chloride Content of admixtures.

k. Water soluble chloride ion content of concrete, ASTM G1218.

l. Proportions of all ingredients including all admixtures added either at time of batching or at job site.

D. Cylinder Compression Test Reports:

1. Submit two copies of certified test reports to Engineer indicating results of tests required in Part 3 hereof.

E. Ready-Mix Delivery Tickets:

1. Submit one copy to the Engineer of ready-mix delivery ticket for each load delivered.

2. Include identification and quantity of concrete supplied.

3. Include time loaded and time unloaded.
4. Reading of revolution counter at times initial water added, supplemental water added, and unloading completed.
5. Amounts of initial and supplemental water added, and name of individual authorizing supplementing water.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store cement in watertight enclosures and protect against dampness, contamination and warehouse set.

B. Stockpile aggregates to prevent segregation, or contamination with other materials or other sizes of aggregates. Use only one supply source for each aggregate stockpile.

C. Store admixtures to prevent contamination, evaporation or damage. Protect liquid admixtures from freezing or harmful temperature ranges. Agitate emulsions prior to use.

D. Store rubber and plastic materials in a cool place away from direct sunlight.

1.8 INSPECTION AND TESTING

A. The Contractor agrees to accept as final the results of tests, inspection and reports as may be made by the testing laboratory.

B. Inspection
1. During the progress of the work, the General Contractor shall provide free and safe access to the work at all times to the Engineer and the Owner's representative. He/she shall cooperate with the Engineer to obtain proper inspection of all work and shall furnish any required samples of concrete for testing.

C. Laboratory Inspection and Testing
1. During the progress of the work, a testing laboratory paid for by the Contractor, contacted and coordinated by the Contractor, and approved by the Engineer, shall conduct necessary field tests and make compensation for any variation in water content of the aggregate; and shall further direct that all batches shall be as nearly uniform as possible by the use of selected materials which are accurately measured, thoroughly mixed, and maintained at a constant water-cement ratio and consistency.
2. Provide the Owner and Engineer with necessary reports covering all of the above.
3. The payment for laboratory inspection and testing will be the responsibility of the Contractor.
4. Coordination and scheduling of tests by the testing lab shall be the responsibility of the Contractor.

5. Testing required because of changes requested by the Owner in materials, sources of materials, or mix proportions; and extra testing of concrete or materials because of failure to meet the Specification requirements are to be paid for by the Owner.

D. Required Testing During Construction:

The following minimum testing shall be performed, and field/ lab- results submitted to the structural Engineer for approval:

1. Air entrainment at placement – ASTM C231
2. Slump – ASTM C143
3. Compressive strength – ASTM C39

Concrete cylinder samples shall be obtained from each concrete delivery truck for compressive strength testing. Five (5) cylinders shall be made from each sample. Each cylinder shall be standard 6" diameter by 12" tall. One (1) cylinder will be tested at 7-day cure, and three (3) cylinders will be tested at 28-day cure to determine compressive strength of the concrete in accordance with ASTM C39. Air entrainment and slump will be tested at each sample as well. Retain the fifth cylinder sample for potential 56-day compressive testing and/ or petrographic examination. Test results which are determined by the Engineer to be deficient or questionable will require that the contractor pay for additional testing and coring of the in-place concrete, including petrographic examination with report as direct by the Engineer. Concrete determined by the Engineer to remain deficient after final testing shall be entirely removed and replaced at no additional cost.

1.9 GUARANTEES

Upon completion of the work and prior to final payment, the Contractor shall submit a guarantee of his work as free from defect in materials and workmanship. The guarantee shall be for a period of three (3) years. The guarantee shall be signed by an officer of the Contractor's firm and sealed if a corporation.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

B. Aggregate: ASTM C 33, uniformly graded, from a single source. Maximum aggregate size = 1 ½" at foundations and ¾" at slabs.

C. Water: ASTM C 94.

D. Air-Entraining Admixture: ASTM C 260.

E. Water-Reducing Admixture: ASTM C 494, Type A.

F. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

G. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

H. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.2 CONCRETE PRODUCTION

A. Concrete Mixes, General - Prepare design mixes, proportioned according to ACI 211.1 and ACI 301-05.

Refer to the Contract Drawings for additional information.

B. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116 and furnish batch ticket information.

C. Concrete shall have a minimum compressive strength of 4500 psi for foundations and 4500 psi for slabs at 28 days with a slump of no more than 4” and air entrainment of 4 ½ to 7 ½%.

D. Proportioning: Proportion ingredients to produce a well-graded mix of high density and maximum workability consistent with approved mix design and subject to the characteristics as specified in the Contract Drawings.

E. Mixing:

1. Central Mixed Concrete - 1 minute for mixer capacities one cubic yard or less plus 15 seconds for each cubic yard or fraction thereof of additional capacity.

2. Truck Mixed Concrete - 100 revolutions after the introduction of all ingredients.

F. Tempering and Control of Mixing Water:

1. Mix concrete only in quantities for immediate use. Do not use concrete which has stiffened due to initial set or concrete which cannot be discharged within 1-1/2 hours or 300 revolutions of the mixer drum after the introduction of the mixing water.

2. Water may be added to concrete arriving at the site, only if neither the maximum slump nor the maximum water cement ratio is exceeded. Provide additional cement if required by the addition of water to maintain water cement ratio within specified limits. Obtain Engineer's approval prior to adding water or cement.

3. Incorporate any added water or cement by additional mixing equal to half the total mixing required.

2.3 CURING MATERIALS

A. Impervious-sheet materials shall conform to ASTM C 171, type optional, except that polyethylene sheet shall not be used.

B. Burlap and cotton mat used for curing shall conform to AASHTO M 182, Class 2.

C. Topically applied and admix curing compounds and/or agents are not allowed due to project required epoxy floor coating and concrete densifier.

2.4 WATER

A. Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that non-potable water may be used if it meets the requirements of ASTM C94.

2.5 EMBEDDED ITEMS

A. Embedded items shall be of the size and type indicated or as needed for the application.

B. All other embedded items shall also be securely anchored and protected from damage or displacement.

2.6 JOINT MATERIALS

A. Expansion joint fillers shall be preformed materials conforming to ASTM D 1751.

B. Sawable type contraction joint inserts shall conform to COE CRD-C 540. Nonsawable joint inserts shall have sufficient stiffness to permit placement in plastic concrete without undue deviation from a straight line and shall conform to the physical requirements of COE CRD-C 540, with the exception of Section 3.4 "Resistance to Sawing". Plastic inserts shall be polyvinyl chloride conforming to the materials requirements of COE CRD-C 572.

C. Expansion joint fillers shall be a closed-cell, non-absorbent, synthetic foam, and as recommended by the sealant manufacturer. Filler shall be totally compatible with sealant, primer, and substrates. Backers shall conform to the requirements of ASTM C 962, Type A, such as Ceramar as manufactured by W.R. Meadows, Expansion Joint Filler as manufactured by BASF-Sonneborn, or approved equal.

2.7 LIQUID DENSIFIER/ SEALER

A. Liquid densifier sealer shall be a high performance, deeply penetrating concrete densifier; odorless, colorless, VOC – compliant, non-yellowing silicate and siliconate based solution designed to hard, dustproof and protect concrete floors and to resist black rubber tire marks. The compound must contain a minimum solids content of 30% of which 50% is siliconate.

1. Basis of Design: Euco Diamond Hard by The Euclid Chemical Co.

PART 3 - EXECUTION

3.1 PREPARATION FOR PLACING

A. Before commencing concrete placement, the following shall be performed:

B. Surface Preparation:

1. Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water.
2. Earth (subgrade, base, or subbase courses) surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. The foundation shall be well drained and shall be satisfactorily graded and uniformly compacted.
3. Rock surfaces upon which concrete is to be placed shall be free from oil, standing or running water, ice, mud, drummy rock, coating, debris, and loose, semi-detached or unsound fragments. Joints in rock shall be cleaned to a satisfactory depth, as determined by the Engineer, and to firm rock on the sides. Immediately before the concrete is placed, rock surfaces shall be cleaned thoroughly by the use of air-water jets or sandblasting as specified below for Previously Placed Concrete. Rock surfaces shall be kept continuously moist for at least 24 hours immediately prior to placing concrete thereon. All horizontal and approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar proportioned similar to that in the concrete mixture. Concrete shall be placed before the mortar stiffens.
4. Concrete surfaces to which other concrete is to be bonded shall be abraded in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Laitance and loose particles shall be removed. Surfaces shall be thoroughly washed and shall be moist but without free water when concrete is placed.

C. Equipment:

1. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material.
2. Equipment for consolidating concrete shall be at the placing site and in proper working order.

3. Equipment and material for curing and for protecting concrete from weather or mechanical damage shall be at the placing site, in proper working condition, and in sufficient amount for the entire placement.

D. When hot, windy conditions during concreting appear probable, equipment and material shall be at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage, cracking, or other damaging drying of the concrete.

E. Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings or required. Conduit and other embedded items shall be clean and free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding shall not be performed on embedded metals within 2 feet of the surface of the concrete. Tack welding shall not be performed on or to embedded items.

F. Forms shall be in place, cleaned, coated, and adequately supported, in accordance with Section 03 1000, CONCRETE FORMWORK. Reinforcing steel shall be in place, cleaned, tied, and adequately supported, in accordance with Section 03 2000, CONCRETE REINFORCEMENT.

3.2 INSTALLATION

A. Conveying:

1. Convey concrete from mixer to final position as rapidly as practical without segregation or loss of material.
2. Use only metal or metal lined chutes with maximum length of 20 feet, maximum slope 1 vertical to 2 horizontal and minimum slope 1 vertical to 3 horizontal.
3. Provide a hopper at the end of long belt conveyors and chutes not meeting the above requirements.
4. Conveying by pumping methods shall conform to ACI 304. Maximum loss of slump, 2 inches. Do not use pipe made of aluminum or aluminum alloy to convey concrete. Should pumping be required for this project, all costs for pumping shall be borne by the Contractor. No additional compensation will be considered for any pumping costs.

B. Depositing:

1. Deposit concrete in a continuous operation until the section is completed. Regulate rate of placement so concrete remains plastic and flows into position.
2. Maximum height of concrete free fall is 4 feet.
3. All concrete shall be placed within 2 hours of batching. All concrete on site more than 2 hours from batching time shall be rejected and sent back to the plant.

C. Consolidation:

1. Use mechanical vibrating, rodding or spading for consolidation. Conform to 309-72, "Recommended Practice For Consolidation of Concrete."
2. Do not use vibrators to transport concrete in forms.
3. Minimum vibrator speed 8000 rpm.
4. Vertically invert vibrators at points 18 inches apart to a depth sufficient to penetrate 6 inches into the preceding layer. Vibrate each location for a length of time to obtain adequate consolidation (generally 5 to 15 seconds).

D. Embedments:

1. Accurately position and securely fasten all anchor bolts, castings, steel shapes, conduit, sleeves, and other materials to be embedded in the concrete.
2. Embedments shall be clean when installed. Remove concrete spatter from all surfaces not in contact with concrete.

E. Wash-out:

1. The Contractor shall remove residue from concrete mixing wash-out from all landscape, walkways, curbs, driveways, and similar surfaces to the satisfaction of the Owner.

3.3 CURING

A. Normal Conditions

1. All concrete shall be prevented from drying for at least the first 7 days after placing. All slabs shall be cured by spraying on the specified curing compound as per the manufacturer's printed instructions. Concrete walls shall be cured as carefully as the slabs. However, instead of covering the sides with the curing compound, it would be satisfactory if the forms were "loosened after the concrete had hardened" and the wall sprinkled with water frequently for at least five (5) days allowing the water to flow down the sides between the forms and the concrete. After the five-day wetting the forms may be removed. Curing compounds which discolor the concrete are not permitted.

B. Cold Weather Conditions

1. Whenever the temperature of the surrounding air is below 40 degrees F, all concrete shall be maintained at a temperature of not less than 50 degrees F for at least 72 hours and shall be protected from freezing for at least another 72 hours, or for as much time as is necessary to insure proper curing of the concrete. The housing, covering or other protection used in connection with the curing shall remain in place and intact for at least 24 hours after the artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing. The approved practice for Winter Concreting are those outlined in ACI 306.

C. Alternates

1. Methods of curing other than those specified above shall be approved by the Engineer before being used.

3.4 FINISHING CONCRETE

A. Defective Concrete:

1. Any concrete which is not formed as shown on the plans or for any reason is out of alignment or level, or shows a defective surface shall be corrected or replaced as directed by the Engineer.
2. Repair all surface defects and tie holes immediately after form removal.
3. Remove honeycombed or otherwise defective concrete to sound concrete with square cut edges to avoid feathering.

B. Patching:

1. Immediately after removing the forms, all concrete surfaces shall be inspected and any poor joints, voids, stone pockets or other defective areas and all tie holes shall at once be patched before the concrete is thoroughly dry. The patching shall be done in such a manner that it shall form a homogeneous part, in appearance, and action of the main concrete. Fins shall be removed and patched as required where concrete is exposed.

C. Exposed Concrete:

1. All exposed concrete finish shall be as produced through the use of new smooth plywood or metal forms.

D. Rubbing:

1. Smooth rubbed finish shall be provided for exposed surfaces including walls and spandrels.
2. Smooth rubbed finish shall be produced on green concrete. All necessary patching shall be done immediately after forms have been removed and rubbing shall be completed not later than the following day. Surfaces shall be wetted and rubbed with carborundum brick or other abrasive until a uniform color and texture is produced. No cement grout or slush shall be used other than the cement paste drawn from the green concrete itself by the rubbing process.

E. Finishing Floors and Slabs: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces.

F. Float Finish: Apply float finish, defined in ACI 301, to surfaces indicated, to surfaces to receive trowel finish.

G. Trowel Finish: Apply a trowel finish to surfaces indicated and to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

H. After apply float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

I. Finish and measure surface so gap at any point between concrete surface and an unleveled free-standing 10-foot long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following: 1/8 inch.

J. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

3.5 FIELD QUALITY CONTROL

A. Concrete Tests: Conduct the following minimum tests in accordance with the requirements of ACI 301, Section 16.3.

1. Strength Test:
   a. Mold and cure five (5) cylinders from each sample. Test one at 7 days for information and three (3) at 28 days for acceptance. Retain one (1) cylinder for potential 56-day compressive testing and/ or petrographic examination.
2. Slump Test: Conduct test for each strength test sample and whenever consistency of concrete appears to vary.
3. Air Content: Conduct test from one of first three batches mixed each day and for each strength test sample.

B. Acceptance of Concrete:

1. The strength level of concrete will be considered satisfactory so long as the average of all sets of three consecutive strength test results equals or exceeds the specified 28-day strength and no individual strength test result falls below the specified strength by more than 200 psi.
2. Upon failure of test cylinder results, the Owner may require the Contractor, at his/her expense, to obtain and test at least three 2-inch diameter core samples from the area in question. Conform to ASTM C42. Concrete will be considered adequate if the average of the three cores is at least 85% of, and if no single core is less than 75% of the specified 28-day strength.
3. Upon failure of core test results, the Owner may require the Contractor, at his/her expense, to perform load tests as specified in ACI 318, Chapter 20. Should load tests fail to prove the concrete has reached the required strength; the Contractor shall remove and replace all defective concrete at no additional cost to the Owner. No contract extension will be considered for the time required to remove and replace defective concrete.
4. Fill all core holes as specified for repairing defective concrete.

END OF SECTION

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Protecting existing trees and vegetation to remain, including temporary fencing for trees in close proximity to construction operations.
2. Clearing and grubbing.
3. Stripping topsoil.
4. Removing above and below grade site improvements.
5. Disconnecting, capping or sealing of utilities as required.

B. Alternates: N/A

C. Items to Be Installed Only: Not Applicable.

1.3 RELATED WORK

A. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 31 2000 – EARTH MOVING for soil materials, excavating, backfilling, and site grading and removal of site utilities.
2. Section 31 2500 – EROSION AND SEDIMENATION CONTROLS for required erosion and sedimentation control measures.

1.4 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red

than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.5 MATERIAL OWNERSHIP

A. Except for materials indicated to remain the Owner's property, cleared materials shall become Contractor's property and shall be removed from the Project site and disposed of legally offsite.

1.6 SUBMITTALS

A. Photographs sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings, according to Section 01 7000 - PROJECT CLOSEOUT identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until erosion and sedimentation control measures are in place.

E. Protection of Existing Improvements: Provide protection necessary to prevent damage

to existing improvements indicated to remain in place or outside of the limit of work. Protect improvements on adjoining properties and on Owner's property.

1. Restore improvements damaged by Contractor's clearing activities to their original condition, at no additional expense to the Commonwealth.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.2 TREE PROTECTION

A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within fenced area.

2. Do not permit vehicles, equipment, or foot traffic within fenced area.

3. Maintain fenced area free of weeds and trash.

4. Except as otherwise directed, cutting and trimming of existing trees will not be permitted.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.

2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.

3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.

4. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the Engineer.

1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.

2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the Engineer.

3.3 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify the Owner not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without the Owner's written permission.

3.4 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.

3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade in landscaped areas. Completely remove stumps and roots under pavement, sidewalks and building footprint.

4. Use only hand methods for grubbing within tree protection zone.

5. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, or as otherwise noted, unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent saturation, windblown dust or contamination by air-borne weed seed.

1. Limit height of topsoil stockpiles to 72 inches.

2. Do not stockpile topsoil within tree protection zones.

3. Surround stockpiles with silt fence.

3.6 EXCESS TOPSOIL

A. Topsoil that has been stripped and stockpiled but is not needed after the completion of all final topsoil spreading and grassing, shall become the property of the Contractor and shall be removed and disposed of offsite.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.8 DISPOSAL

A. Disposal: Remove surplus soil material, boulders, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off the Owner's property.

1. Burning and burying on site is prohibited.

2. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION

SECTION 312000-EARTH MOVING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Preparing subgrades for structures and landscaping.
2. Excavating and backfilling for pavements and structures.
3. Subbase course for concrete pavements.
4. Subbase and base course for asphalt paving.
5. Excavating and backfilling for utility trenches.
6. Remove and replace unsuitable existing fill material.
7. Over excavation for structures

1.3 Related Work:

A. The following items are not included in this Section and will be performed under the designated Sections:

1. Section 03 3000 - CAST-IN-PLACE CONCRETE for granular course if placed over vapor retarder and beneath the slab-on-grade.
2. Section 31 1000 - SITE CLEARING for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

3. Section 31 2500 – EROSION AND SEDIMENTATION CONTROLS for temporary erosion and sedimentation control measures.

1.4 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Designer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.

3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Designer. Unauthorized excavation, as well as remedial work directed by Designer, shall be without additional compensation.

G. Fill: Suitable soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment without systematic drilling, ram hammering, ripping, or blasting, when permitted.

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SITE INVESTIGATION

A. The Contractor shall satisfy himself 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 confirmation of subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of work and other matters which can affect the work or the cost thereof under this contract. Failure by the Contractor to acquaint himself with all information concerning these conditions will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.

1.6 SUBSURFACE DATA

A. Variations in existing ground or subsurface soil conditions from those indicated on the test pit or boring logs shall not constitute grounds for changes in contract price or completion dates of this contract.

1.7 SUBMITTALS

A. Product Data: For the following:

1. Each type of plastic warning tape.

2. Geotextile.

3. Controlled low-strength material, including design mixture.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.

2. Laboratory compaction curve according to ASTM D 1557 for each onsite and borrow soil material proposed for fill and backfill.

C. Pre-excavation Photographs and Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins. Maintain catalog of up-to-date photographs at the site.

1.8 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by Designer and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify the Owner not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without the Owner's written permission.

3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

1.9 QUALITY CONTROL

A. Compaction and materials testing results shall be submitted to the Engineer for review as outlined in the following sections.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Common Fill: Imported Common Fill should consist of Satisfactory Soils having a maximum particle size of 6 inches and no more than 25 percent by weight passing the US No. 200 sieve.

D. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

E. Subbase Material: Material meeting the minimum requirements for Processed Gravel, as defined by the Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges (Section M1.03.1). The gradation requirements for Processed Gravel for Subbase are as follows:

Percent Passing

Sieve Size	By Weight
3 in.	100
1½ in.	70-100
¾ in.	50-85
No. 4	30-60
No. 200	0-10

F. Base Course: Material meeting the minimum requirements for DENSE-GRADED CRUSHED STONE, as defined by the Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges (Section M2.01.7). The gradation requirements for Dense-graded Crushed Stone for Subbase are as follows:

Percent Passing

Sieve Size	By Weight
2 in.	100
1½ in.	70-100
¾ in.	50-85
No. 4	30-55
No. 50	8-24
No. 200	3-10

G. Engineered Fill (Structural Fill): Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940. The gradation requirements for Engineered Fill (Structural Fill) are as follows:

Percent Passing

Sieve Size	By Weight
8 in.	100
3 in.	70-100*
¾ in.	45-95
No. 4	30-90
No. 10	25-80
No. 40	10-50
No. 200	0-10

**Three-inch maximum particle size within twelve (12) inches of the underside of footings or slabs.*

H. Gravel Borrow: Shall comply with Massachusetts Highway Department Specifications Section M1.03.0 Type C. Maximum size of stone in the gravel shall be 2" in its largest dimension. The gradation requirements for Gravel Borrow are as follows:

Percent Passing

Sieve Size	By Weight
1/2 in.	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-10

**2" maximum stone.*

I. Three quarter inch stone: Imported 3/4-inch stone meeting MHD section M.2.01.4

Sieve Size	Percent Passing
1 inch	100
3/4 inch	90-100
½ inch	10-50
3/8 inch	0-20
No. 4	0-5

J. Bedding Course: Bedding course for utilities shall comply with the requirements of Sand listed below.

K. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

L. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

M. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

N. Free draining angular washed stone: Imported angular double washed stone with particle size ranging from ¾ inch to 1-1/2 inch.

O. Peastone: Shall be crusher or natural stone meeting the following gradation

Sieve Size	Percent Passing
1/2 inch	100
3/8 inch	85-100
No 4	10-30
No 8	0-10
No. 16	0-5

P. Stonedust: Shall be stone screenings as specified in MHD specification Section M2.05.0 stone crusher material completely passing a No. 4 sieve with not less than 40% passing a No. 8 Sieve.

2.2 GEOTEXTILES

A. Geotextile Filter Fabric: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
4. Tear Strength: 56 lbf; ASTM D 4533.
5. Puncture Strength: 56 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
7. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Geotextile Stabilization Fabric: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 90 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape

manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.

2. Yellow: Gas, oil, steam, and dangerous materials.

3. Orange: Telephone and other communications.

4. Blue: Water systems.

5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section 31 1000 - SITE CLEARING.

C. Protect and maintain erosion and sedimentation controls, which are specified in Section 32 2500 - EROSION, during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. Dispose of contaminated water in accordance with regulations of authorities having jurisdiction.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

   a. 24 inches outside of concrete forms other than at footings.

   b. 12 inches outside of concrete forms at footings.

   c. 6 inches outside of minimum required dimensions of concrete cast against grade.

   d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.

   e. 6 inches beneath bottom of concrete slabs on grade.

   f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.

3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 OVER-EXCAVATION OF UNSUITABLE SOILS

A. When approved by the Engineer, the Contractor may be required to remove unsuitable soils, fill, or natural soil materials in areas where fills are to be placed when determined to be undesirable in their location or condition. The Contractor shall be required to remove the undesirable material and backfill with approved material properly compacted.

B. At locations where unstable soil is identified, the removal and replacement of such soil shall be as directed as recommended by the Engineer.

C. At locations where soil is wet of optimum moisture, the Contractor shall provide a “good faith” effort in drying and discing these areas prior to completing over-excavation as approved by the Engineer.

D. Where over-excavations are required adjacent or beneath the location of the proposed drainage structure, undercut and backfill shall be done over a sufficient distance adjacent to the installation to prevent future operations from disturbing the completed drainage structure.

E. All material removed in the work of over-excavation will be classified by the Engineer and Owner as either suitable for other use without excessive manipulation and utilized by the Contractor elsewhere in the work, or unsuitable for future use and disposed of by the Contractor as directed by the Engineer.

F. The Contractor shall conduct over-excavation operations in such a way that the necessary measurements can be taken before any backfill is placed.

G. Backfill in over-excavation areas shall be placed as a continuous operation along with the over-excavation operation. Backfill materials shall be consistent with the intended use. No backfill material shall be placed in water unless otherwise permitted by the Engineer.

3.9 SUBGRADE INSPECTION

A. Notify Designer when excavations have reached required subgrade.

B. If Designer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed and specified herein.

C. Proof-roll subgrade below the building slabs and pavements with suitable equipment, as specified herein, to identify soft pockets and areas of excess yielding. During the proof rolling process, the subgrade shall be reviewed by the Engineer to identify unstable zones. Where fine-grained subgrades are present, proof rolling may need to be accomplished statically, to reduce the potential for disturbing the subgrade. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.

2. Proof-roll with minimum 10-ton vibratory rollers or a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons, in open areas or a minimum 1-ton walk-behind roller or large plate compactor in trenches or confined areas.

3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Designer, and replace with compacted backfill or fill as recommended by the Engineer.

D. The Contractor shall be responsible for maintaining stable soil subgrades. Fine-grained subgrade soils exposed during construction are anticipated to be easily disturbed by construction traffic and are likely to become unstable when above the optimum moisture content. The Contractor shall be responsible for managing construction traffic, stockpiling of materials, and providing routine maintenance to protect subgrades from disturbance. Where subgrades are damaged by freezing temperatures, frost, rain,

accumulated water, or construction activities, they shall be reconstructed as directed by the Designer, without additional compensation.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Alternatively, the unauthorized excavation may be backfilled to design elevation using appropriate soil for the intended use. Lean concrete fill, with 28-day compressive strength of 2500 psi may also be used when approved by Designer.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Designer.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees, if applicable.

3.12 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, damp proofing, waterproofing, and perimeter insulation.

2. Observing and accepting subgrade.

3. Surveying locations of underground utilities for Record Documents.

4. Testing and inspecting underground utilities.

5. Removing concrete formwork.

6. Removing trash and debris.

7. Removing temporary shoring and bracing, and sheeting.

8. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.13 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 03 3000 - CAST-IN-PLACE CONCRETE.

D. Place and compact initial backfill of subbase material free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.14 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as shown on the contract drawings.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

D. All soils to be compacted to a minimum of 95% of its maximum density at optimum moisture content or as otherwise specified.

3.15 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.16 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent; and areas within 10 feet of structures, building slabs, steps, and pavements at 92 percent.

2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.

3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.

4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.17 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch.

2. Walks: Plus or minus 1/2 inch. Tolerance will not alleviate the contractor’s responsibility to meet required slopes in Accessible areas.

3. Pavements: Plus or minus 1/4 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.18 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.

2. Place base course material over subbase course under hot-mix asphalt pavement.

3. Shape subbase and base course to required crown elevations and cross-slope grades.

4. Place subbase and base course 6 inches or less in compacted thickness in a single layer.

5. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

6. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.19 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent materials testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Designer.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved/Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.

2. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Designer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the property.

END OF SECTION

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SECTION 312319 - DEWATERING

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Construction dewatering.

B. Alternates: Not Applicable.

C. Items To Be Installed Only: Not Applicable.

D. Items To Be Furnished Only: Not Applicable.

E. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 31 2000 - EARTH MOVING for excavating, backfilling, site grading, and for site utilities.

1.3 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

B. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1. Test liquids for hazardous waste at start of construction operations and provide on-site remediation as acceptable to authorities having jurisdiction.

2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.

3. Prevent surface water from entering excavations by grading, dikes, or other means.

4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.

5. Remove dewatering system when no longer required for construction.

1.4 SUBMITTALS

A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.

2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.

B. Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Qualification Data: For qualified Installer

D. Field quality-control reports.

E. Other Informational Submittals:

1. Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer that has specialized in dewatering work.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1. Review methods and procedures related to dewatering including, but not limited to, the following:

a. Inspection and discussion of condition of site to be dewatered including coordination with temporary erosion control measures and temporary controls and protections.

b. Geotechnical report.

c. Proposed site clearing and excavations.

d. Existing utilities and subsurface conditions.

e. Coordination for interruption, shutoff, capping, and continuation of utility services.

f. Construction schedule. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

g. Testing and monitoring of dewatering system.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Engineer no fewer than two days in advance of proposed interruption of utility.

2. Do not proceed with interruption of utility without Engineer’s written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering.

2. The geotechnical report is referenced elsewhere in the Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.

2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Monitor dewatering systems continuously.

E. Promptly repair damages to adjacent facilities caused by dewatering.

F. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 31 2500 - EROSION AND SEDIMENTATION CONTROLS during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves,

appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.

2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.3 FIELD QUALITY CONTROL

A. Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated; additional observation wells may be required by authorities having jurisdiction.

B. Observe and record daily elevation of ground water and piezometric water levels in observation wells.

1. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.

2. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

C. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

END OF SECTION

SECTION 312500 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Control measures to prevent all erosion, siltation and sedimentation of wetlands, waterways, construction areas, adjacent areas and off-site areas.

2. Control measures shall be accomplished adjacent to or in the following work areas:

   a. Soil stockpiles and on-site storage and staging areas.

   b. Cut and fill slopes and other stripped and graded areas.

   c. Constructed and existing swales and ditches.

   d. Protection of drainage structure inlets.

   e. At edge of wetlands areas, if applicable, as shown on Drawings.

   f. Protection of stockpile areas.

3. Additional means of protection shall be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional cost to the Owner

4. Periodic maintenance of all sediment control structures shall be provided to ensure intended purpose is accomplished. Sediment control measures shall be in working condition at the end of each day.

5. On a weekly basis and after any significant rainfall, sediment control structures shall be inspected for integrity. Any damaged device shall be corrected immediately.

B. Alternates: Not Applicable.

C. Items To Be Installed Only: Not Applicable.

D. Items To Be Furnished Only: Not Applicable.

E. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 31 1000 – SITE CLEARING for protection of existing tress and other vegetation to remain.

2. Section 31 2000 – EARTH MOVING for soil materials, excavating, backfilling, and site grading and removal of site utilities.

1.3 QUALITY ASSURANCE

A. The Contractor shall develop, submit, and comply with the requirements of Stormwater Pollution Prevention Plan (SWPPP) prepared for the NPDES permit, and all other applicable requirements of governing authorities having jurisdiction. The specifications and drawings are not represented as being comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both the Owner's and adjacent property. It shall be the responsibility of the Contractor to prepare the required SWPPP plan and to file for a Construction General Permit through the EPA at least 14-business days prior to the start of work. The Contractor shall prepare the SWPPP in advance and submit to Engineer and Town for review. The Engineer may review and request changes / modifications as required.

1. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to a sediment and erosion control plan specific to the site that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction whichever is more stringent.

2. Regulatory Order of Conditions (Included in appendix)

B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.

C. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time, and the length of time of exposure.

D. Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

E. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream bed, provide measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.

F. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.

G. The Contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of the sediment facility is reduced by one-half.

H. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

I. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Siltation Fence: Fabricated or prefabricated unit consisting of the following filter fabric properties:

1)	Grab Tensile Strength	90	ASTM D1682
2)	Elongation at Failure (%)	50	ASTM D1682
3)	Mullen Burst Strength (PSI)	190	ASTM D3786
4)	Puncture Strength (lbs)	70	ASTMD751(modified)
5)	Slurry Flow Rate (gal/min/sf)	0.5	Virginia DOT VTM-51
6)	Equivalent Opening Size	40-80 US	Std Sieve CW-02215
7)	Ultraviolet Radiation Stability (%)	90	ASTM G26

B. Fencing: Steel posts shall be standard 6-foot-long metal stamped drive stakes commonly used to support snow fences. Fencing shall be new four-foot height wood lath snow fencing. Provide suitable steel staples or heavy nylon cord for securing filter cloth to support system.

C. Silt Socks: The silt socks for construction of erosion control devices shall be 12” in diameter. In areas of slope greater than 2:1(horizontal: vertical), silt sock must be secured in place by stakes. Silt socks shall be either lapped or butted at the ends to create a continuous line.

D. Stakes: Stakes for silt socks shall be one of the following materials: Wood stakes of sound hardwood 2 by 2 inches in size or steel reinforcing bars of at least No. 4 size. Lengths shall be approximately three feet.

E. Protective Measures: As temporary coverings on ground areas subject to erosion, provide one of the following protective measures, and as directed by the Engineer:

1. Hay or straw temporary mulch, 100 pounds per 1,000 square feet.

2. Wood fiber cellulose temporary mulch, 35 pounds per 1,000 square feet.
3. Tackifier for anchoring mulch or straw shall be a non-petroleum based liquid bonding agent specifically made for anchoring hay or straw.
4. Provide natural (jute, wood excelsior) or man-made (glass fiber) covering with suitable staples or anchors to secure to ground surface. Note that wire stapes and non-biodegradable coverings shall not be used for any area that will be mown turf.
5. Temporary vegetative cover for graded areas shall be undamaged, air dry threshed straw or hay free of undesirable weed seed.
6. Provide temporary settling basis as shown on the contract drawings and described in the specifications.

F. Stone for Construction Entrance: Shall be ASTM designation C-33, size No. 2 (1-1/2" to 2-1/2") crushed stone.

PART 3 - EXECUTION

3.1 STABILIZED CONSTRUCTION ENTRANCE AND STONE BERMS

A. Stone as specified above.

B. Length: As effective, but not less than 40 feet.

C. Thickness: Not less than eight inches.

D. Width: Not less than full width of all points on ingress or egress, but not less than 20 feet.

E. Washing: When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it shall be done on an area stabilized with crushed stone which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through the use of sandbags, gravel boards or other approved methods.

F. Maintenance: The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-or-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spoiled, dropped, washed or tracked onto public rights-of-way must be removed immediately.

G. Place crushed stone berms in locations required and as directed. Berms shall have side slopes of 1:3 or less.

H. Inspect stone berms periodically and replace and/or regrade crushed stone as required.

3.2 SILT FENCING

A. Excavate a 6-inch trench along the upstream side of the desired fence location.

B. Drive fence posts a minimum of 1'-6" into the ground. Install fence, well-staked at maximum eight-foot intervals in locations as shown on Drawings. Secure fabric to fence and bury fabric end within the six-inch-deep trench cut.

C. Lay lower 12 inches of silt fence into the trench, 6 inches deep and 6 inches wide. Backfill trench and compact.

D. Overlap joints in fabric at post to prevent leakage of silt at seam.

3.3 VEGETATIVE STABILIZATION / TEMPORARY SEEDING

A. Grassing shall be applied according to State of Massachusetts DOT Standard Specifications.

3.4 INLET PROTECTION

A. Install silt fence or straw bales around inlet as specified herein.

3.5 DUST CONTROL

A. Throughout the construction period the Contractor shall carry on an active program for the control of fugitive dust within all site construction zones, or areas disturbed as a result of construction. Control methods shall include the following: Apply calcium chloride at a uniform rate of one and one-half (1 ½) pounds per square yard in areas subject to blowing. For emergency control of dust apply water to affected areas. The source of supply and the method of application for water are the responsibility of the contractor.

B. The frequency and methods of application for fugitive dust control shall be as directed by the Engineer.

3.6 TEMPORARY PROTECTIVE COVERINGS (AFTER GROWING SEASON)

A. Place temporary covering for erosion and sedimentation control on all areas that have been graded and left exposed after October 30. Contractor shall have the choice to use either or both of the methods described herein.

B. Hay or straw shall be anchored in-place by one of the following methods and as approved by the Engineer: Mechanical “crimping” with a tractor drawn device specifically devised to cut mulch into top two inches of soil surface or application of non-petroleum based liquid tackifier, applied at a rate and in accordance with manufacturer’s instructions for specific mulch material utilized.

C. Placement of mesh or blanket matting and anchoring in place shall be in accordance with manufacturer’s printed instructions.

D. Inspect protective coverings periodically and reset or replace materials as required.

3.7 SILT SOCKS

A. Silt Socks shall be constructed and installed as required by the order of conditions prior to the start of work.

END OF SECTION

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SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Temporary excavation support and protection systems.

B. Alternates: Not Applicable.

C. Items To Be Installed Only: Not Applicable.

D. Items To Be Furnished Only: Not Applicable.

E. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 015000 - TEMPORARY FACILITIES for temporary utilities and support facilities.

1.3 PERFORMANCE REQUIREMENTS

A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.

1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified professional engineer.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

4. Provide vibration monitory to prevent impacts on adjacent structures and utilities.

1.4 SUBMITTALS

A. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems.

1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

B. Qualification Data: For Installer and professional engineer.

C. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems.

1.5 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:

a. Soil Boring Logs.

b. Existing utilities and subsurface conditions.

c. Proposed excavations.

d. Proposed equipment.

e. Monitoring of excavation support and protection system.

f. Working area location and stability.

g. Coordination with waterproofing.

h. Abandonment or removal of excavation support and protection system.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied facilities unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Engineer no fewer than two days in advance of proposed interruption of utility.

2. Do not proceed with interruption of utility without Engineer's written permission.

B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.

D. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

E. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

F. Timber Piling: ASTM D 25, species listed in AWPA C3, pressure-treated in accordance with AWPA C3.

G. Grout: Suitable for service, minimum 4,000 psi.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.

D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

END OF SECTION

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SECTION 32 01 23 RECYCLED BASE COURSE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

This item shall include the crushing and pulverizing of the existing asphalt pavement in the areas shown on the plans in accordance with these specifications. The work shall conform to the dimensions and typical cross section shown on the plans and with the lines and grades established by the Engineer. The material created by this process may be used as a base course material for paved walkways, or gravel fill shown on the plans – contingent to testing. This item shall include crushing, pulverizing, and processing of the existing asphalt pavement and underlying granular base, fine-grading and compacting the recycled base course for new bituminous paving, including the removal of any excess, or non-compliant material.

B. Related Sections:

1. Asphalt Paving - Section 32 1216

C. Pavement Subsurface Data: Bidders are expected to examine the site and decide for themselves the character of materials to be encountered.

D. All work shall conform to the requirements of Massachusetts DOT Standard Specifications for Highways and Bridges Section 403 - Reclaimed Pavement for Base Course, Supplemental Specifications Section 403 - Reclaimed Pavement for Base Course and/or Sub-base, and Supplemental Specifications Section M1 – Soils and Borrow Materials.

E. Recycled base material shall be tested in accordance with specification 32 11 23 Aggregate Base Course, or in accordance with the intended use, and shall meet the requirements of this section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Recycled Base Course:

1. The cold mixed recycled base material, after the crushing, pulverizing, hammer milling, and blending shall conform to the following gradation requirement per Mass DOT Supplemental Specifications M1, Subsection M1.09.0 – Reclaimed Pavement Borrow Material:

Sieve Designation	% Passing by Weight
3”	100
1 ½”	70-100
3/4”	50-85
#4	30-60
#50	8-24
#200	3-10

2. Acceptable base material shall consist of hard, durable stones and shall be free from excess flat, elongated, soft or disintegrated pieces, dirt, or other objectionable matter. No additional asphalt cements or recycling agents are required to be added to the blended materials under this specification. It shall be the contractor’s responsibility to perform tests on the blended material to determine if it meets gradation requirements. The Contractor shall amend the Recycled base course with dense graded crushed stone as required to raise the grade or provide the required section depth. The cold mixed base course shall be checked and accepted by the Engineer before fine-grading operations are started.

3. Any proposed widening areas adjacent to the existing pavement shall be excavated to form a box-cut. The exposed subgrades in the box-cut areas shall be densified with a vibratory roller compactor. The cold mixed base course shall then be regraded across the entire width of the base to create a uniform depth of approximately 8” of reclaimed subbase material. Excess material shall be removed from the site.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. Equipment: The equipment to be used must have an established capability of crushing/pulverizing bituminous concrete pavements to produce a crushed material meeting the gradation specified above. The equipment must be capable of crushing/pulverizing to a depth of 8 inches in one pass at a rate of production consistent with the time allowed under the contract.

B. Finishing and Compacting:

1. All percentages of compaction specified herein shall be related to the maximum dry density as established by Method D ASTM Designation D 1557-70 and verified in the field by ASTM Designation D1556-68, D2167-66, or an approved nuclear density testing device. Prior to placing, at least one (1) laboratory test (Method D, ASTM D 1557-70) shall be made on a representative sample of the recycled base course material to determine gradation and moisture-density characteristics. This test will be made by a testing laboratory selected by the Owner and at the Contractor's expense.

2. Initial field density tests to determine the actual in-place densities being attained will be made at the Contractor's expense and in sufficient quantity to determine that the required compaction is being attained. All retesting necessitated by failure of the recycled material to comply with the minimum percent of compaction shall be performed by a testing laboratory selected by the Owner and the cost of the retesting will be paid for by the Contractor.

C. Equipment: Where vibratory compaction equipment is specified herein or is directed to be used by the Owner all such equipment whether plate-type or roller shall be furnished with a vibrating surface at least 24 inches in width, and capable of operating at a minimum of 2,000 blows per minute. Equipment not specifically designed as vibrating compaction equipment shall not be permitted for compaction of either existing in-place materials or of fills, refills and backfills. Jack hammers and similar equipment not specifically designed and manufactured for the compaction of granular materials will not be approved for use.

D. Procedure:

1. Surfaces to be compacted shall, unless otherwise specified, shall be compacted by not less than six (6) complete passes of the approved vibratory compactors, or as necessary to obtain the required percentage of compaction. A complete pass shall consist of the entire coverage of the surface. Surfaces are to be compacted with one trip of the equipment. Each trip of the equipment shall overlap the previous trip by at least one (1) foot.

2. It is the intent of these compaction requirements that the minimum in-place dry density of the compacted materials resulting from the specified minimum number of passes of the compaction equipment will be equal to or greater than the minimum percentages specified herein. Additional passes of the specified equipment shall be required if the minimum in-place dry densities as specified are not obtained with the minimum passes indicated. No additional payment will be made for this compaction.

3.2 GRADING REQUIREMENTS

A. After the base course has been completely blended and compacted with the underlying base material to a full depth so that a uniform 8" depth is created across the width of the base, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified, reshaped, recompacted, and otherwise manipulated as the Engineer may direct until the required smoothness and accuracy are met. The finished surface shall not vary more than 1/4" in ten feet (10').

Refer to Specification Sections 32 1216 Asphalt Paving, and Section 32 1123 – Aggregate Base Course, for required pavement grading tolerances.

3.3 PROTECTION

A. Work on the base course shall not be accomplished during freezing temperatures nor when the subgrade is wet. When the aggregates contain frozen materials or when the underlying course is frozen, the construction shall be stopped.

END OF SECTION

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SECTION 321123 - AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 SECTION INCLUDES

A. Aggregate base course for placement under proposed paving.

1.3 SUBMITTALS

A. Contractor to submit product data sheet and sieve analysis results.

B. Samples shall be submitted at the request of the Engineer.

C. Nuclear density test results are to be in accordance with ASTM D6938-10.

1.4 RELATED SECTIONS

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 31 2000 – Earth Moving
2. Section 32 1216 – Asphalt Paving

1.5 REFERENCES

A. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and an 18-inch Drop.

B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

C. MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES (Latest Edition).

PART 2 - PRODUCTS

2.1 MATERIALS

A. Subbase and Base Course as specified in Section 31 2000 - Earth Moving.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT

A. Spread fill over prepared substrate to a total compacted thickness as specified on drawings.

B. Place aggregate in maximum six (6) inch layers compact to specified density.

C. Level and grade surfaces to elevations and gradients indicated on the Contract Drawings.

D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10-foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation From Design Elevation: Within 1/4inch.

3.5 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with ASTM Dl557 and alternatively with ASTM D2922 at a frequency as requested by the Engineer or School.

END OF SECTION

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Work under this section includes the installation of bituminous concrete pavement to a total compacted thickness indicated in the Contract Drawings. All existing pavement damaged or displaced as a result of the construction operations will be restored in accordance with the requirements for this Section.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 31 2000 - EARTH MOVING for aggregate subbase and base courses and for aggregate pavement shoulders.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

C. Material Certificates: For each paving material, from manufacturer.

D. Nuclear density gauge field density test results for finish grade.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the Massachusetts Department of Transportation Highway Division (Mass DOT).

B. Regulatory Requirements: Unless otherwise superseded by this specification, comply with materials, workmanship, and other applicable requirements of the Massachusetts Department of Transportation Highway Division (MassDOT) for hot mix asphalt paving work.

1. Unless otherwise superseded by this specification, comply with requirements of the Massachusetts Department of Transportation Highway Division (MassDOT) Standard Specifications for Highways and Bridges, including supplemental specifications and special provisions.
2. Comply with requirements of the Americans with Disabilities Act (ADA) and the Massachusetts Architectural Access Board (MAAB). If these requirements cannot be met with the grades and slopes indicated on the plans, notify the Engineer immediately.
3. Comply with requirements of the local authority having jurisdiction concerning the location and construction of accessible curb cuts.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.
   1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
      a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
      b. Review condition of subgrade and preparatory work.
      c. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
      d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
   1. Tack Coat: Minimum surface temperature of 60 deg F.
   2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.

3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

C. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 GRAVEL BASE:

A. Subbase and Base Aggregate as specified in Section 321123 Aggregate Base Course.

2.2 MINERAL AGGREGATE

A. Conform to subsection M3.11.04 of the Standard Specifications.

Coarse Aggregate Shall be clean, crushed rock consisting of the angular fragments obtained by breaking and crushing shattered natural rock, free from detrimental quantity of thin or elongated pieces, free from dirt or other objectionable materials, and shall have a percentage of wear, as determined by the Los Angeles Abrasion Test (AASHTO-T96), of not more than 30. It shall be surfaced dry and shall have a moisture content of not more than ½% after drying. The use of crushed gravel stone will not be permitted.

Fine Aggregate shall consist of one of the following:

1. 100% natural sand
2. 100% stone sand
3. A blend of sand and stone screenings the proportions of which shall be approved by the engineer.
4. A blend of natural sand and stone sand.

Natural sand shall consist of inert, hard, durable grains of quartz or other hard, durable rock, free from topsoil or clay, surface coatings, organic matter or other deleterious materials. When the primary source of material, passing the No. 200 sieve, is obtained from natural sand, these fines must be approved prior to use. Stone sand shall be a processed material prepared from stone screenings to produce a consistently graded material conforming to the specification requirement. The stone screening shall be the product of a secondary crusher and shall be free from dirt, clay, organic matter, excess fines or other deleterious material. The fine aggregate as delivered to the mixer shall meet the following requirements:

Sieve Size	Percent Passing
3/8 inch	100-95
No. 8	70-95
No. 50	20-40
No. 200	2-16

2.3 BITUMINOUS MATERIALS

A. Bituminous materials shall conform to the requirements of these Specifications and Section M3.11.06 of the Standard Specification.

B. Bitumen delivered to a project or to a mix plant must be accompanied by a proper certificate signed by the producer's authorized representative. Shipments of material not accompanied by a certificate will not be accepted for use in the work.

C. Bituminous Concrete Paving shall be Class I, Type 1-1, as specified in Section M3.11.0 of the Standard Specifications.

D. Hot Poured Joint Sealer: Sealer shall be composed of a mixture of materials which will form a resilient and adhesive compound capable of effectively sealing joints in concrete and shall conform to the requirements of AASHTO M 173.

E. Tack coat shall consist of either emulsified asphalt, Grade MS-l conforming to

Section M3.03.0, or cutback asphalt, Grade MC-70 or MC-250 conforming to

Section M3.02.0 of the Standard Specifications.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine exposed Subbase and Base surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 COLD MILLING

A. If applicable, clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

3.3 PATCHING (If Applicable)

A. Existing Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Existing Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.
   1. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd.
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.4 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
   1. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

D. The permanent bituminous concrete pavement surface courses shall be provided in accordance with details and the applicable requirements of Massachusetts Standard Specifications Section 460, Subsection 460.40 and Section M.3.11 for "Materials" and Subsection 460.60 for "Construction Methods". The surface shall be rolled free of any roller marks, ridges, and voids, and shall be repaired if directed.

E. Per Section 460.61 of the MHD Standard Specifications, the temperature of asphalt at time of placement shall be as follows:

Base Temp °F on which mix is placed	Mat Thickness					
	1/2"	3/4"	1"	1-1/2"	2"	3" +
35-40				305	295	280
40-50			310	300	285	275
50-60		310	300	295	280	270
60-70	310	300	290	285	275	265
70-80	300	290	285	280	270	265
80-90	290	280	275	270	265	260
90+	290	275	270	265	260	255

Temperatures listed above shall be within plus or minus 15° F

3.6 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
   1. Clean contact surfaces and apply tack coat to joints.
   2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
   3. Offset transverse joints, in successive courses, a minimum of 24 inches.
   4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

3.7 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
   1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: ASTM D 2041, per MHD Specifications.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within MHD Specification tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas.

3.9 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Designer.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent materials testing agency to perform field quality-control testing. Perform nuclear field density testing at least 1 test for every 2,000 sq. ft of paved area, but in no case less than 3 tests.

B. Test the plane of the finished surfaces of base, binder, and surface courses with a 16-foot straightedge, except use a 10-foot straightedge on vertical courses and on the top course of resurfaced streets which contain manhole covers, valve boxes, and the like.

C. Carefully apply the straightedge immediately after the first compaction by rolling, and from then on as may be necessary until and after the final compaction of the material in place. Hold the straightedge in successive positions parallel to the road centerline and in contact with the road surface; check the entire area from one side of the pavement to the other.

D. Correct irregularities which vary 3/8 inch from a true finished surface in base and binder courses, and 1/4 inch in top courses.

E. Irregularities which may develop before the completion of rolling and while the material is still workable, may be remedied by loosening the surface mixture and removing or adding material as necessary. Should any unsatisfactory irregularities or defects remain after final compaction, correct the defective work by removing and replacing with new material to form a true and even surface.

3.11 OPENING TO TRAFFIC

A. 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, and the pavement has achieved a maximum temperature of 140 degrees F.

B. If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Designer.

3.12 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION

SECTION 32 31 13 - FENCING

PART 1 – GENERAL

Where applicable, all fence construction work shall comply with the latest edition of Mass DOT's Standard Specifications for Highways and Bridges, more specifically section 644 "Chain Link Fence and Gates". The Town reserves the right to alter specifications to satisfy the Town's best interest. Where differences exist between this specification and MDOT specification, the more stringent spec shall govern.

1.1 WORK INCLUDED

A. Perform all work required to complete the work of the Section, as indicated. Such work includes, but is not limited to, the following:

1. 10' Chain Link Fence and Gates (Type 2B Fusion Bonded Fabric and Powder Coated Framework and Fittings)

1.2 REFERENCES

A. ASTM - American Society for Testing and Materials

B. Commonwealth of Massachusetts Highway Department - Standard Specifications for Highways and Bridges (MHD Specifications)

1.3 SUBMITTALS

A. Shop Drawings: Supply shop drawings at an approved scale for location, installation and erection of all parts of the work under this Section including but not limited to the following:

1. 10' Chain Link Fence and Gates

B. Product Information: Provide manufacturer's data showing installation and limitations in use. Supply Certificates of Compliance for all materials required for fabrication and installation. Work includes but is not limited to the following items:

1. 10' Chain Link Fence and Gates

PART 2 - PRODUCTS

2.1 CHAIN LINK FENCE AND GATES

A. The types of fencing required for the project are as indicated below, subject to detailed material requirements which follow.

B. All sections shall include top, mid, and bottom rails.

C. All material shall be new, and products of recognized reputable manufacturers. Used, re- rolled or re-galvanized materials are not acceptable.

D. Like items of materials provided hereinafter shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance and replacement.

E. Fabric shall be premium grade helically wound and woven steel core wire in accordance with ASTM F668 Class 2B vinyl fabric. Color to be black.

F. Material specifics shall be as follows:

Core Wire	Zinc	Mesh (inches) (gauges)	(oz/S.F.)	Size
10’ Chain link fence	0.192	6	.40	2”

G. Selvages: Fence fabric shall be knuckled selvage at top and bottom.

H. Powdercoated framework shall be steel pipe - Type II: Cold formed and welded steel pipe complying with ASTM F 1043, Group IC, with minimum yield strength of 50,000 psi (344 MPa), sizes as indicated. Protective coating per ASTM F 1043, external coating Type B, zinc with organic overcoat, 0.9 oz/ft² (275 g/m²) minimum zinc coating with chromate conversion coating and verifiable polymer film. Internal coating Type B, minimum 0.9 oz/ft² (275 g/m²) zinc or Type D, zinc pigmented, 81% nominal coating, minimum 3 mils (0.08 mm) thick. Color to be black.

I. Schedule of pipe sizes shall be as follows:

Application	Height in Feet	Out. Dim. in Inches	Weight lbs / foot
Terminal/ Corner Posts	10’-0”	4-0”	9.11
Line Post	10’-0”	2-7/8”	5.79
Top, Mid, and Bottom Rails	N/A	1-2/3”	2.27

J. Posts shall be of sufficient length to allow for installation into concrete footings to a minimum depth of 4’-0” below finish grade.

K. Post tops shall be provided with post caps which fit securely and exclude moisture.

L. Top Rails shall have lengths not less than eighteen feet and shall be fitted with min. 6 inch long outside sleeved or internally swaged couplings for connecting the lengths into a continuous run. Provide top rail with pass-through fittings at line posts and rail end cups and brace bands at terminal or gate posts.

M. Bottom Rails shall be secured to line posts with steel boulevard clamps, and to terminal, corner, gate or pull posts with rail end cups and brace bands.

N. Fence fittings and accessories shall be fabricated of steel or cast iron and shall conform to minimum requirements of ASTM F-626, and as below. Following fabrication and galvanizing, all fence fittings shall receive a 10 to 14 mil thick fusion bonded vinyl coating to match fabric color. With the exception of field painting for nuts and bolts, no painted fittings will be accepted.

1. Stretcher Bars shall not be less than 3/16 by 3/4 inch and not less than 2 inches shorter than the nominal height of the fabric with which they are to be used. One stretcher bar shall be provided for each end and gate post, and two for each corner and pull post.

2. Fabric connectors shall be provided in sufficient number for attaching the fabric to all line posts at intervals not exceeding twelve inches (12"); and not exceeding twelve inches (12") when attaching fabric to top or bottom rail. Connectors shall be galvanized with a min. 0.8 oz s.f. coating of zinc.

3. Unless designated otherwise on the details, tie wires shall be fabricated from rolled 9 gauge wire stock which has been cut to required lengths for hand-twisted connections at the site.

4. Tension Bands shall be provided in sufficient number for attaching the fabric and stretcher bars to all terminal posts at intervals not exceeding twelve inches (12"). Tension bands shall be formed from flat or beveled steel and shall have a minimum thickness after galvanizing of 0.078 inch; and minimum width of 3/4 inch for posts 4 inch O.D. or less; and 0.108 inch thickness by 7/8 inch for posts larger than 4 inch O.D. Brace bands shall be formed from flat or beveled steel and shall have a minimum thickness of 0.108 inch after galvanizing; and a minimum width of 3/4 inch. Attachment bolts shall be 5/16 x 1-1/4 inch galvanized carriage bolts with nuts, ASTM A-307, Grade A.

5. Other hardware required shall be fabricated from steel, and galvanized in accordance with ASTM A123 and/or ASTM A153.

O. Chain Link Swing Gates:

1. Fabricate chain link swing gates in accordance with ASTM F 900 using galvanized 1.90” steel tubular members weighing 2.28 lb/ft. Fusion or stainless steel welded connections forming rigid one-piece unit. Frames shall be thermally fused after fabrication with minimum 10 mils per ASTM 1043. Coating before fabrication will not be allowed.

2. Chain link fabric for gates shall match fabric of fencing.

3. Pedestrian and vehicle gate posts shall be steel pipe – type II finished to match fence posts. Pedestrian gates shall be 4 feet wide, Vehicle Gate shall be a single 6-foot wide gate. Post sizing is as follows:

Gate leaf height	Post Size Inches	Weight (lb/ft.)
8 ft (Pedestrian)	2.875	5.794
10 ft (Vehicle)	2.875	5.794

4. Gate hinges shall be heavy-duty offset type. Install gate for 180-degree outward operation. Hinges shall have large bearing surfaces for clamping in position. The hinges shall not twist or turn under the action of the gate. The gates shall be capable of being opened and closed easily by one person.

5. All pedestrian gates shall be equipped with a positive closure latch and padlock fitting.

6. Vehicle gate shall be equipped with a drop rod to hold the inactive leaf. Provide gate stop pipe to engage center drop rod.

P. Poured-in-place concrete footings shall have a twenty-eight day compressive strength of 3,000 psi.

PART 3 - EXECUTION

3.1 CHAIN LINK FENCE AND GATES

A. General: Unless modified herein, installation of fencing shall meet the requirements of ASTM F567. Erect fencing in straight lines between angle points by skilled mechanics experienced in this type of construction.

B. Post Holes: Post holes for line and terminal or gate posts shall be excavated to a minimum size of eighteen inches by forty-eight inches (18" x 48").

1. Backfill concrete to within 6 inches of finished grade and crown top to shed water.
2. Set posts with plumb vertical alignment.

3. All earth material excavated for post holes shall be disposed of off-site by the contractor.

C. Space posts in the fence line equally with maximum spacing of 8 feet.

D. Hanging Fabric:

1. Fasten chain link fence fabric to terminal posts, and gate posts with tension bars and tension bar band
2. Fasten chain link fence fabric on TENNIS COURT side unless otherwise noted on plans.

3. Fence fabric shall be secured to all rails and to posts that are not terminal, or gate with wire ties at specified spacing. Tie down wire shall be woven through the fence fabric, completely around the rail and wire shall be twisted securely with three twists on the rail side of the fence and the tails of the wire cut off to preclude untwisting by hand. Twisted tie wire ends shall be turned under at horizontal rails and turned down at vertical rails to reduce potential for human contact.

4. Stretch fabric as tightly as possible without pulling the material out of shape. Top of fabric shall be parallel with top rail.

E. Testing of Fence Fabric: Each fence panel shall be constructed such that it will pass the following test. Deflection of fence fabric shall be no greater than 2 inches when a force of 30 pounds is applied in the center of the panel, perpendicular to the plane of the fence fabric. Fabric shall return to original position when force is released.

F. Gates, install gates in conformance with specification and detail requirements. Test swing and latch and adjust as necessary for proper operation.

END OF SECTION

SECTION 321838 - COURT ASPHALT, COLOR FINISH SYSTEM AND PAINTING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR), which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION

A. These specifications provide minimum standards for the preparation and installation of Asphalt tennis court base and textured acrylic surfacing, color finishes and striping of proposed asphalt tennis and basketball courts.

1.3 RELATED SECTIONS

A. Examine the Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 31 2000 – Earth Moving
2. Section 32 1123 - Aggregate Base Course
3. Section 23 1216 – Asphalt Paving

1.4 REFERENCES

A. National Asphalt Paving Association (NAPA)

B. United States Tennis Association (USTA)

C. International Tennis Federation (ITF)

D. American Sport Builders Association (ASBA)

E. National Federation of High School Associations (NFHS)

F. Massachusetts Interscholastic Athletic Associated (MIAA)

1.5 SUBMITTALS

A. Provide manufacturer specifications for all components, color chart and installation instructions.

B. Authorized Applicator certificate from the approved surfacing system manufacturer.

C. ITF classification certificate for the system approved to be installed.

D. Reference list from the installer of at least 5 projects of similar scope successfully completed in the past 3 years.

E. The Contractor will prepare and submit for approval a colored court striping and marking plan shop drawing indicating all markings for approval prior to commencing this phase of the work.

F. Provide specific manufacturers product data for all types of paints and overlays to be used in tennis marking and surfacing.

G. Current Material Safety Data Sheets (MSDS) for all system components.

H. Proof of certification of the ASBA certified tennis court builder that the contractor employs on their team.

1.6 MATERIAL HANDLING AND STORAGE

A. Store materials in accordance with manufacturer specifications and MSDS.

B. Deliver products to the site in original unopened containers with proper labels attached.

C. All surfacing materials shall be nonflammable.

D. Do not store or use materials that have been exposed to temperatures below 32d F.

1.7 GUARANTEE

A. Surfacing system contractor shall provide a guarantee against defects in the materials and workmanship for a period of one year from the date of substantial completion.

1.8 SURFACING INSTALLER QUALIFICATIONS

A. Surfacing Installer shall be regularly engaged in construction and surfacing of acrylic tennis courts, play courts or similar surfaces.

B. Installer shall be an Authorized Applicator of the specified surface system.

C. Installer shall be a certified tennis court builder as certified by the ASBA.

1.9 MANUFACTURER QUALIFICATIONS

A. Approved surfacing system manufacturer shall provide documentation that the surface to be installed has been classified by the ITF as a medium pace surface.

1.10 QUALITY ASSURANCE

A. Asphalt surfacing shall conform to Part 3 of this specification section. Surfacing materials shall conform to the guidelines of the ASBA for planarity.

B. Asphalt surface and base materials must be installed to proper slope requirements and

specifications, in accordance with the American Sports Builders Association (ASBA) Guide Specifications, and must be thoroughly cured (minimum of twenty-one (21) days for asphalt), before the application of any surfacing, filler or color finish materials.

C. All surface coatings products shall for a surfacing SYSTEM and shall be supplied by a single manufacturer.

D. The contractor shall record the batch number of each product used on the site and maintain it through the warranty period.

E. The contractor shall provide the Engineer, upon request, an estimate of the volume of each product to be used on the site.

F. The installer shall be an authorized applicator of the approved surfacing system.

G. The Contractor is responsible for the removal or correction of any overspray, spill or marking not in compliance with applicable court layout.

1.11 SITE CONDITIONS

A. Do not install Surfacing materials when rainfall in imminent or extremely high humidity prevents drying.

B. Do not apply surfacing materials unless surface and air temperature are 50°F and rising.

C. Do not apply surfacing materials if surface temperature is in excess of 140°F.

1.12 WARRANTY

A. The manufacturer will guarantee the surfacing material for two (2) years from date of finished application against chalking, checking, fading, discoloration, or other adverse effects from ultraviolet rays of the sun, from weather moisture or from weather temperatures.

PART 2 - PRODUCTS

2.1 ASPHALT BASE MATERIALS

A. **Asphalt for tennis courts shall comply with the requirements of specification section 32 1216 Asphalt Paving except for the following:**

Bituminous Design mix for Tennis Court Pavements:

- **RAP – Recycled Asphalt content shall NOT be used in the design mix.**
- **RAS – Recycled Asphalt Shingles shall NOT be used in design mix.**
- **The Performance Grade (PG) of asphalt binder used in the design mix shall be tailored specifically for the climate/environmental conditions of the**

proposed project's geographic location and ability to resist thermal cracking at low temperatures. Contractor to submit documentation of examples where similar PG design mixes were used for tennis court construction projects in the same regional area.

B. Grading tolerances for the Asphalt tennis and basketball courts are revised as noted in Part 3 of this specification section.

2.2 COLOR SELECTION

A. Tennis and basketball court play area will be surfaced in US Open Blue, with the safety area surfaced in US Open Green. Colors to be approved by Owner.

2.3 TENNIS AND BASKETBALL COURT SURFACING/ COLOR SYSTEM

A. Shall be the Plexipave color finish and filler system intended for tennis courts on asphalt surfaces as manufactured by California Products Corp. Jefferson Massachusetts or approved equal SYSTEM.

B. Court Patch Binder
1. For use in patching cracks, holes and depressions. Shall be 100% acrylic resin blended with Portland Cement and silica sand with a minimum of 46% solids by weight and 8.7 to 8.9 lbs/gallon.

C. Crack Filler
1. For use in filling fine cracks, shall be 100% acrylic resin heavily filled with sand with a minimum of 85% solids by weight and solids by weight of 15 lbs/gallon.

D. Resurfacer / Filler Course
1. For new or existing asphalt pavement. Shall be 100% acrylic resin with not less than 3.5% attapulgite with a minimum of 26.7% solids by weight and solids by weight of 8.7 to 8.9 lbs/gallon.

E. Finish color and Texture
1. Shall be 100% acrylic resin (with no vinyl copolymerization constituent) and selected UV inhibitors for color stability, and required color pigments and a minimum of 36.5% solids by weight and solids by weight of 10.0-10.2 lbs/gallon.
2. Color Base shall be 100% acrylic resin containing no vinyl copolymerization constituent, selected UV inhibitors for color stability, not more than 65% rounded silica sand, required color pigments and a minimum of 74% solids by weight and solids by weight of 13.1 to 14.1 lbs/gallon.

F. Line Paint
1. Shall be 100% acrylic resin containing no alkyds or vinyl constituents. Shall contain selected UV inhibitors for color stability, required color pigments and silica sand for texture. Line paint shall have a minimum of 60.5% solids by weight and solids by weight of 12.0-12.3 lbs/gallon.

G. All surfacing materials shall be non-flammable and shall have a VOC content of not less than 100g./ltr measured by EPA method 24. Local sands are not acceptable as an admixture to the color playing surfaces.

PART 3 - EXECUTION

3.1 ASPHALT SURFACE

A. The Asphalt surface shall be laid on an approved subbase and bituminous asphalt mat, a minimum of three inches (3") in thickness. The General Contractor shall provide compaction test results of 95% or greater for the installed subbase and asphalt surface.

B. Special care shall be taken during the paving process to insure smooth and imperceptible joints, blending asphalt uniformly to achieve a continuous surface. Infra-red heating devices shall be employed when temperature of material in place falls below 150d F.

C. The court surface, i.e., asphalt substrate, shall not vary under a 10' straight edge more than 1/8".

D. It is the responsibility of the asphalt-paving contractor to flood the surface with water immediately after the asphalt is capable of handling traffic, and within 24 hours of installation. If, after 20 minutes of drying time, there are birdbaths (depressions deeper than 1/8") evident, it shall be the responsibility of the General Contractor, in conjunction with the surfacing contractor to determine the method of correction, subject to the engineers approval. Cold tar patching, skin patching or sand mix patching IS NOT an acceptable means of correction.

E. Any oil spills (hydraulic, diesel, motor oil, etc.) shall be completely removed, either by chipping out or removing and replacing with new, keyed in asphalt. The minimum depth of any asphalt replacement shall be one inch. The curing time for the asphalt base is 21 days. It shall be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of the tennis surfacing system.

F. It shall be the responsibility of the general contractor to determine if the asphalt substrate meets all design specifications; i.e., cross slopes, planarity and specific project criteria. After all the above conditions are met, the tennis surfacing contractor must, in writing, accept the planarity of the asphalt receiving base before installation of the surfacing can commence.

G. Start of surface application shall constitute sub contractor's acceptance of the asphaltic concrete surface to receive tennis surfacing.

3.2 SITE CONDITIONS

A. Installation shall not take place if adjacent or concurrent construction generates excessive dust, abrasives or any other by-product that, in the opinion of the installer, would be harmful to the tennis surfacing, until completion of such works.

B. Surfacing or fillers shall not be installed unless the temperature is fifty degrees Fahrenheit and rising. Installation shall be executed only in fully dry conditions.

C. If, in the opinion of the installer, the weather and/or climatic conditions are detrimental to the proper installation of the surfacing materials, work shall be delayed until conditions are acceptable.

3.3 BASE PREPARATION

A. Prior to applying the court surfacing system, the tennis net sleeves, tennis net strap anchor and fencing shall be installed and approved by the Engineer.

B. Prior to application of Tennis court surfacing or filler, the contractor shall sawcut the asphalt base to ¾ of the depth of the asphalt mat with a 1/8" wide saw blade. Saw cuts shall be in the locations shown on plan and shall be straight and true to line. Contractor shall thoroughly clean courts of resulting dust and debris prior to application of tennis surfacing. Standard surfacing filler materials may then be swept into or over these joints.

C. The asphalt base surface shall be thoroughly brushed or blown free of all dirt, oil, grease, leaves and other debris before placing any fillers or coloring systems. Treat areas showing algae or moss growth with bleach or other approved product and rinse the surface thoroughly with water. Once the surface is properly prepared and has been cured, apply the filler or texture materials. Any depressions greater than one-eighth inch (1/8") shall be repaired by a trowel application of undiluted Filler Coat. This is to achieve a uniform texture, without ridges on the court area, including patches or treated areas.

D. Holes and cracks: Cracks and holes shall be cleaned and a suitable soil sterilant, as approved by the Engineer, shall be applied to kill all vegetation 14 days prior to use of Court Patch Binder according to manufacturer's specifications.

E. Depressions: Depressions holding enough water to cover a five cent piece shall be filled with Court Patch Binder Mix. 3 gallons of Court Patch Binder, 100 lbs. 60-80 silica sand, 1 gallon Dry Portland Cement (Type I). This step shall be accomplished prior to the squeegee application of Acrylic Resurfacer. The contractor shall flood all the courts and then allow draining. Define and mark all areas holding enough water to cover a nickel. After defined areas are dry, prime with tack coat mixture of 2 parts water/l part Court Patch Binder. Allow tack coat to dry completely. Spread Court Patch Binder mix true to grade using a straight edge (never a squeegee) for strike off. Steel trowel or wood float the patch so that the texture matches the surrounding area. Never add water to mix. Light misting on surface and edges to feather in is allowed as needed to maintain work ability. Allow to dry thoroughly and cure.

F. Filler materials must be allowed to thoroughly dry and cure to a uniform texture. This can avoid any future problems of surface peeling. If shrinkage cracks appear, they shall be addressed prior to the application of additional coats.

G. The prepared court base surface shall be reviewed and approved by the surfacing contractor prior to the application of any additional color or filler coats. Additional filler coats may be necessary if the court surface is too rough or has an excess amount of

voids in the surface.

3.4 COURT SURFACING APPLICATION

A. The court surfacing material will be applied to the entire area of the tennis courts to the proposed perimeter fence line, in at least three applications, in the selected and approved colors, as approved by the Engineer, in order to form a court surface with a true, uniform texture and color. Surfacing application work shall be performed by skilled mechanics, in a workmanlike manner, in accordance with the manufacturer's standard printed instructions. However, no work will be performed when rain is imminent or when the ambient air or asphalt surface temperature is below 55 degrees Fahrenheit.

B. Install all surface coating materials in strict adherence to the manufacturers specifications. Blend all materials with a mechanical mixer during application to achieve a uniform mixture.

C. Filler Course. (Acrylic Resurfacer): Filler course shall be applied to the clean underlying surface in one application to obtain a total quantity of not less than .06 gallon per square yard based on the material prior to any dilution. Acrylic Resurfacer shall be used to pre-coat depression and crack/hole repairs to achieve true planarity prior to filler course application.

1. Two coats of Acrylic Resurfacer shall be used to properly fill all voids in the asphalt surface. Use clean, dry 50-60 mesh sand and clean, potable water to make mixes. The quantity of sand and water in the above mix may be adjusted within above limits to complement the roughness and temperature of the surface.
2. Mix all ingredients thoroughly and continually during application using accepted mixing devices. Contractor shall use a rubber bladed squeegee to apply each coat of Acrylic Resurfacer as required.
3. Allow the application of Acrylic Resurfacer to dry thoroughly. Scrape off all ridges and rough spots prior to any subsequent application of Acrylic Resurfacer or subsequent cushion or color surface system.

3.5 APPLICATION OF ACRYLIC COLOR PLAYING SURFACE

A. All areas to be color coated shall be clean, free from sand, clay, grease, dust, salt or other foreign matters. The Contractor shall obtain the Engineer's approval, prior to applying any surface treatment.

B. Application shall be made by manufacturer recommended rubber faced squeegees. Surfacing mixtures shall be poured on to the court surface and spread to the specified, uniform thickness in a regular pattern.

C. A total of 3 applications of color surfacing material shall be made to achieve the manufacturers recommended application rate and thickness. No application shall be made until the previous coat is thoroughly dry.

3.6 LINE PAINTING

A. Base lines shall be not more than four inches (4") wide and playing lines not more than

two inches (2") wide, accurately located, and marked in accordance with ASBA, MIAA, NFHS, and USTA guidelines. Line paint shall be as recommended or approved by the manufacturer of the color surfacing material; use of traffic, oil, alkyd or solvent-vehicle type paint is prohibited. All measurements will be to the outer edge of the lines, except the center line and the center mark, which will be on the center line of the court. The painting will be done by skilled mechanics, in a workmanlike manner, in accordance with the manufacturer's standard printed instructions.

B. Lines shall be white unless otherwise noted on the drawings. The edges of lines to be marked shall be taped to insure a crisp line. The line paint shall have a texture similar to the surrounding play surface.

3.7 PROTECTION

A. Erect temporary barriers to protect coatings during drying and curing.

B. Lock gates to prevent court use until acceptance by the Engineer.

3.8 CLEAN UP

A. Remove all containers, surplus materials and debris. Remove all spills, and splatter from adjacent pavements, lawn and site amenities. Dispose of debris and excess materials in accordance with local, state and Federal regulations.

B. Leave site in a clean, orderly, 'as new' condition.

END OF SECTION

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SECTION 329250 – LOAM AND SEED

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

B. Examine all other Sections of the Specifications for requirements which affect work of this Section, whether or not such work is specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by, work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 WORK INCLUDES

A. Refer to the Drawings for the extent and details of the work.

B. The work of this Section consists of all seeding and related work as shown on the Drawings or required herein, and includes, but is not limited to, the following:

1. Providing all topsoil required for work of this Section.
2. Screened, stripped and stockpiled topsoil.
3. Providing additional new topsoil from off-site sources, as required to complete work for this Section.
4. Providing all soil amendments, fertilizers, erosion controls and mulches, as required for work in this Section.
5. Scarification of subsoil in preparation for loaming.
6. Spreading and fine grading topsoil for all lawn areas, sodded or seeded.
7. Seeding required for work in this Section.

1.3 RELATED SECTIONS

A. Section 31 2000 – Earth Moving.

1.4 SUBMITTALS

A. Materials List: Submit a complete list of all materials proposed for use in this work, demonstrating complete conformance with the requirements specified.

1. Submit grass seed mixes for approval.

2. Submit topsoil analysis results for review by the Landscape Architect. State recommended quantities of amendments necessary to produce satisfactory topsoil, as stated in the specifications herein. If on-site stockpiled topsoil is to be used, submit topsoil analysis of screened products.
3. Submit product information, with mix ratios and amounts, for hydro mulching to be used during hydro seeding, for Landscape Architect's approval.
4. Submit fertilizer, herbicide and fungicide products for application, as required, for Landscape Architect's approval.
5. Submit mechanical analysis of any soil amendments.

1.5 QUALITY ASSURANCE

A. All seed and amendments shall comply with all federal, state and local laws and regulations requiring inspection for plant disease and insect control.

1.6 PRODUCT HANDLING

A. Delivery and Storage:
1. Deliver all items to the job site in their original containers, with all labels intact and legible at time of the Landscape Architect's inspection.
2. Immediately remove from the site all materials which do not comply with the specified requirements.
3. Use all means necessary to protect seed from moisture and other contaminants which may adversely affect proper germination.
4. Use all means necessary to protect fertilizers, amendments and other materials from moisture and other contaminants which may adversely affect their efficacy.

1.7 JOB CONDITIONS

A. Utilities: Determine the location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions or obstructions, notify Landscape Architect before spreading topsoil.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Topsoil

1. Topsoil stockpiled from on-site stripping, once tested, may be utilized and amended to meet the requirements for New Topsoil (aka Topsoil Mix).
2. All topsoil that was stripped and stockpiled shall be screened to a maximum stone size of three quarters of an inch (3/4") in any dimension.
3. If determined by soil testing that the existing topsoil does not meet these specifications, the topsoil shall be amended to provide an acceptable topsoil for use.

B. New Topsoil for Lawns(Topsoil Mix/Amended Topsoil):

1. New Topsoil (Topsoil Mix): Shall be natural, fertile loam, typically cultivated topsoils of the locality, containing not less than 4% or more than 8% by weight, of decayed organic matter (humus), as determined in ASTM F-1647. If organic amendments are needed to obtain the specified matter content of the topsoil, the organic matter source may be a peat or compost material.
2. Topsoil shall be taken from a well-drained, arable site, free of subsoil, slag and any stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris over ¾" in any dimension.
3. Topsoil shall be free of Quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of Nutgrass, Cyperus Esculentus, and all other primary noxious weeds.
4. Topsoil shall have a pH not less than 6.0 or greater than 7.0.
5. Topsoil shall not have soluble salts greater than 500 parts per million.
6. Topsoil mix (amended topsoil) shall have target Nutrient levels of Phosphorus (P), Potassium (K), Calcium (C) and Magnesium (Mg) in the Optimum Range as determined local Agricultural Extension Service Topsoil testing recommendations for Sportsturf/Golf Fairway Lawn Establishment.
7. Topsoil shall be a loamy sand, sandy loam, loam, sandy clay loam as defined by the USDA, as determined by Pipette Method, in compliance with ASTM F-1632.
8. Topsoil shall not be delivered or placed while in a frozen or muddy condition.

C. Imported Topsoil:

1. The Contractor shall submit representative samples of topsoil he intends to bring onto the site, and samples of topsoil that was stockpiled from on-site stripping, to a Soil Plant Testing Laboratory acceptable to the Engineer or Landscape Architect. All reports shall be sent to the Engineer / Landscape Architect for approval. The cost for testing and analysis of the soils shall be borne by the Contractor.
2. Samples of topsoil to be brought to the site must be approved prior to delivery of topsoil to the site. Imported topsoil shall be amended by the Contractor to comply with the requirements of New Topsoil (aka Topsoil Mix)
3. Testing reports shall include the following tests and recommendations:
    a. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System.

b. The silt and clay content shall be determined by a Pipette Test of soil passing the No. 270 sieve.

c. Percent of organics shall be determined by an Ash Burn Test or Walkley/Black Test (ASTM F-1647).

d. Test for gradation and organics shall be performed by a private testing laboratory approved by the Engineer/Landscape Architect. Tests for soil chemistry and pH may be performed by a public extension service agency.

e. Chemical analysis shall be undertaken for Phosphorus, Potassium, Calcium, Magnesium, Aluminum, Soluble Salts, and acidity (pH).

f. Soil analysis tests shall include recommendations for soil additives to correct soils deficiencies, as necessary, and for additives necessary to meet defined topsoil mix requirements.

g. All tests shall be performed in accordance with the current standards of the Association of Official Agriculture Chemists.

4. Deficiencies in the topsoil shall be corrected by the Contractor

2.2 SOIL AMENDMENTS:

A. Organic Amendments: Shall be Compost or Peat.

1. Peat shall be Canadian sphagnum peat, having an ash content not exceeding 15%, as determined by ASTM D-2974.

2. Compost may be used, provided that the material has been composted in an in-vessel system, and has an ash content not exceeding 40%, and is free from debris and contaminants.

B. Lime

1. Lime shall be an approved agricultural limestone, containing no less than fifty (50%) percent of total carbonates and twenty five (25%) percent total magnesium, with a neutralizing value of at least one hundred (100%) percent.

2. The material shall be ground to such a fineness that forty (40%) percent will pass through a Number 100 U.S. Standard Sieve, and ninety eight (98%) percent will pass through a Number 20 U.S. Standard Sieve.

3. The lime shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis.

4. Any lime which becomes caked or otherwise damaged, making it unsuitable for use, will be rejected.

C. Fertilizers: Quantity, gradation and rate of application shall be determined based on soil tests and recommendations conducted by an approved soil testing laboratory.

D. Water: The Contractor is responsible for providing all water equipment, hoses, etc. for watering throughout the project and until final acceptance of lawn and turf areas by the Landscape Architect.

E. Herbicides, Pesticides and Fungicides: Herbicides, pesticides and fungicides may be used, subject to the approval of the Engineer / Landscape Architect, and handled by state-licensed operators only.

2.3 SEED:

A. Seed

1. Grass seed shall be clean, new crop seed, composed of a mixture of varieties, mixed in proportion by weight and tested for minimum percentages of purity and germination. Submit proposed mixture to the Engineer / Landscape Architect for approval.

2. General Lawn Area Seed Mix:

a. Perennial Ryegrass: 40%

b. Chewing Fescue: 30%

c. Kentucky Bluegrass: 30%

B. Hydroseed Mix (Lawn Areas Only)

1. All work will be carried out by an approved spraying machine specifically used for this work. Amounts of fertilizer used shall reflect recommendations outlined in the Soil Analysis, see Section 2.01 D. The Contractor shall submit to the Landscape Architect for approval, prior to the start of work, a certified statement as to number of pounds of fertilizer, amounts and types of grass seed, and processed fiber, per one hundred (100) gallons of water.

2. Hydromulch: Shall be Terra-Sorb GB, or an approved equal. Add Terra-Sorb to the hydroseed tank at the amount of 60 pounds per acre.

3. Hydroseeding is not permitted for athletic field areas

PART 3 - EXECUTION

3.1 PREPARATION OF SUBSOIL (General Lawn Areas)

A. Prior to spreading topsoil, subsoil should be rough graded to correspond with finish grades, as indicated on the Drawings. Subgrade shall slope to allow for subsurface drainage. Depressions shall be filled and areas which are highly compacted shall be loosened to a depth of 2 inches (2”) minimum, which is adequate for the passage of gravitational water through the subsoil.

B. After acceptance of subsoil grades, loosen and mix subgrade material four to six inches (4”-6”) deep. Remove all stones, sticks, rubbish and other deleterious materials, over ¾ inch in any dimension which may impede the healthy and vigorous growth of grass. Do not allow heavy objects or machinery, except as necessary for the spreading of topsoil, over the seedbeds after the preparation of the subgrade.

C. Subsoil which becomes compacted due to excessive construction activity shall be loosened, as directed by the Engineer / Landscape Architect, at no additional cost to the Owner.

3.2 SPREADING OF TOPSOIL

A. Immediately after approval and loosening of subgrade, evenly spread and lightly compact approved topsoil to finish grades, as indicated on the Drawings. Do not spread topsoil which is in a muddy or frozen condition. Handle no topsoil when dry or above the plastic limit. Install a minimum of six inches (6") of topsoil to lawn areas, unless otherwise indicated on the Drawings.

B. When possible, the spreading of topsoil shall be performed from the center of the lawn area to the perimeter. Contractor may use alternate spreading pattern, if approved in writing by the Engineer / Landscape Architect.

C. Caution should be exercised to minimize or eliminate travel over areas previously covered with topsoil. Topsoil which becomes compacted due to construction activity shall be stripped and re-spread or loosened, as directed by Engineer / Landscape Architect, at no additional cost to the Owner.

3.3 TOPSOIL SEED BED PREPARATION

A. The minimum depth of topsoil in all lawn areas shall be six inches (6"). Contractor is responsible for supplying all topsoil needed from off-site sources.

B. Grade all lawn areas to finish grades, as indicated on the Drawings. When no grades are shown, areas shall have a smooth and continuous grade between existing or fixed controls and elevations shown on plans. Roll, scarify, rake and level, as necessary, to obtain true even lawn surfaces. All lawn areas shall slope to drain. Finish grades shall be approved by Engineer / Landscape Architect prior to commencing any seeding or sodding work.

C. Install soil additives per manufacturer's and topsoil testing lab instructions and as indicated on the Drawings.

D. Amend all disturbed areas to be topsoiled, seeded or sodded to meet amended topsoil target recommendations. Follow the testing lab and manufacturer's recommendations for installation.

E. Spreading Limestone: Spread ground limestone evenly over the topsoil surface. Incorporate limestone within the top two inches (2") of soil, prior to finish raking. Apply limestone at the rate recommended by the testing and analysis agency.

F. Rake and remove all rocks and debris over ¾" in any dimension from the topsoil surface.

3.4 SEEDING

A. Schedule for Seeding: Sow grass seed between April 1 and May 31, or between August 15 and October 1, except as otherwise approved in writing by the Engineer / Landscape Architect.

B. If seeding out of season, as described above, the Contractor is still obligated by all conditions and responsibilities described under 3.06 LAWN MAINTENANCE, until final acceptance of all lawn areas.

C. Before seed is sown, scarify soil and rake until surface is smooth, friable and of uniformly fine texture. Seed evenly at supplier's recommendation rates, lightly rake and water with fine spray. Do not use wet seed which is moldy or otherwise damaged in transit or storage.

D. Mulch bank areas with three to one (3 to 1) slope or greater with straw mulch, one and one half to two (1½ to 2) tons per acre. Secure mulch at Contractor's discretion as to method or need. Wood fiber mulch may be substituted at a rate of 1,400 pounds per acre, at same time as seed and fertilizer.

E. Equipment Calibration

1. The equipment to be used and the methods of seeding shall be subject to the inspection and approval of the Owner's Representative, prior to commencement of seeding operations. Immediately prior to the commencement of seeding operations, the Contractor shall conduct seeding equipment calibration tests in the presence of the Owner's Representative.

F. Applying Seed

1. Mechanical Seeding of Lawn Seed Mix:

a. Seed shall not be placed until soils have stabilized and further settlement is not apparent. Utilize an irrigation system for consolidation of top mix.

b. Seed at a minimum rate of three (3) lbs per 1000 square feet.

c. Sow grass seed, applying half the quantity in one direction and the remaining quantity at right angles to the previous application

d. Do not sow seed on a windy day or when the ground is frozen, wet or otherwise non-tillable.

e. Cover seed with a thin layer of topsoil by raking or dragging. Cover with straw mulch, loosely spread to a uniform depth.

f. Keep soil moist throughout the germination period.

3.5 FERTILIZING

A. The Contractor is to have the topsoil tested for soil fertility by an approved soil testing laboratory, and a complete fertilization program will be recommended by the testing laboratory and Landscape Architect for the installation and maintenance period.

3.6 LAWN MAINTENANCE

A. Maintenance of the grass areas shall begin immediately and generally consist of watering, weeding, fertilization, mowing and edging, reseeding, disease and insect pest control, repair of all erosion, and any other procedure consistent with good horticultural practice, as necessary to insure normal, vigorous and healthy growth.

B. After grass has appeared, reseed all areas which have failed to show a uniform stand of grass.

C. Maintenance shall also include filling, regrading and reseeding, as necessary, to correct depressions caused by settling, subsidence or other physical or mechanical damage.

D. Maintenance shall also include all temporary protection fences, barriers, signs and all other work incidental to proper maintenance.

E. The Contractor shall be responsible for maintenance to establish a uniform stand of the approved grasses until acceptance. After the grass has started, all areas and parts of areas showing poor germination or growth shall be re-seeded, repeatedly, until all areas are covered with a satisfactory growth of grass. At the time of the first cutting, mow lawn with sharp mowing units not less than two and one half inches (2 1/2") high. Lawn shall be maintained between two and one half inches to three and one half inches (2 1/2" - 3 1/2") high. Do not remove more than one third (1/3) of the grass blade. All lawns shall receive a minimum of three (3) mowings before Contractor's request for inspection and acceptance. Additional mowings may be required before acceptance.

F. Where permitted, the contractor shall be responsible for the application of pre-emergent crabgrass control, in accordance with manufacture's recommended rate and timing for all lawn areas the spring following seeding.

G. Fertilization: Second fertilization of all lawn areas shall be done either the following spring after a fall seeding or in the fall after a spring seeding.

H. Watering: The Contractor shall include the cost for daily and, if necessary, continuous watering of all grass areas during a normal eight (8) hour working day.

1. The seed bed shall be maintained in a continuous moist condition, to the depth of 2". Maintain soil moisture satisfactory for good germination and growth of grass until acceptance of lawns.

I. Full and complete written instructions for maintenance of the lawn areas are to be furnished to the Owner, by the Contractor, at least ten (10) days prior to the end of the contractual maintenance period, to familiarize him with the maintenance requirements for proper care and development of lawns.

3.7 INSPECTION AND ACCEPTANCE

A. The Landscape Architect shall inspect the lawns upon written request by the Contractor. The request shall be received at least ten (10) days before the anticipated date of inspection.

B. Final acceptance will not be granted until all seeded areas are in satisfactory condition. No seeded areas will be inspected prior to 60 days from seeding and prior to the completion of two mowings. An acceptable stand of grass will be determined by the Engineer or Landscape Architect.

C. A satisfactory stand of grass which is acceptable is defined as consisting of a uniform stand of at least 60% established, permanent grass species, free of weed species and no bare spots (free of germinating grass) over 1sf in area.

D. If the grass is in satisfactory condition, the Contractor's care and maintenance responsibilities will end. If the grass stand is unsatisfactory, the Contractor's maintenance responsibility shall continue, including a normal program of mowing, irrigation, reseeding, fertilizing and repair until an acceptable stand of grass is achieved.

3.8 CLEAN UP

A. Absolutely no debris may be left on the site. Excavated material shall be removed, as directed. Repair any damage to site or structures to restore them to their original condition, as directed by the Landscape Architect, at no cost to the Owner.

END OF SECTION

SECTION 334100 – STORM UTILITY DRAINAGE

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS (PCR) which are hereby made a part of this Section of the Specifications.

1.2 RELATED DOCUMENTS

A. The requirements of the sections of Division 1 – General Requirements, as listed in the Table of Contents, apply to the work specified in this section.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. D 5034 (1995) Breaking Strength and Elongation of Textile Fabrics (Grab Test)
2. F 405 (1996) Corrugated Polyethylene (PE) Tubing and Fittings
3. F 667 (1985) Large Diameter Corrugated Polyethylene Tubing and Fittings.

B. Unibell Handbook of PVC Pipe

1. C32-73 (1984) Sewer and Manhole Brick
2. C62-85a, Building Brick
3. C76-85a, Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
4. C139-73 (1985) Concrete Masonry units for Construction of Catch Basins and Manholes
5. C270-86b, Mortar for Unit Masonry
6. C443-85A, Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
7. C478-85a, Precast Reinforced Concrete Manhole Sections

1.4 SUBMITTALS

A. The following shall be submitted: Filter Fabric, HDPE Pipe, Free Draining Angular Washed Stone, Control Structures, Drain Manholes, and Catch Basins, Trench drains and inline catch basins.

B. Certifications from the manufacturers, attesting that the materials meet specification requirements, and samples are required for filter fabric, drain pipe and fittings.

C. Submit shop drawings and manufacturer's specifications and installation instructions for all pipe materials, precast concrete catch basins and manholes, frames and covers and detention chambers.

D. Each shipment of pipe, catch basins and metal castings shall be accompanied with the manufacturer's notarized certificate that the materials meet the specification requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Materials delivered to site shall be inspected for damage, unloaded, and stored with minimum handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. During shipment and storage, filter fabric shall be wrapped in burlap or similar heavy-duty protective covering. The storage area shall protect the fabric from mud, soil, dust and debris. Filter fabric materials that are not to be installed immediately shall not be stored in direct sunlight. Plastic pipe shall be installed within six (6) months from the date of manufacture, unless otherwise approved.

B. Handling: Material shall be handled in such a manner as to insure delivery to the trench in sound undamaged condition. Pipe shall be carried and not dragged to the trench.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS

A. Corrugated High-Density Polyethylene (HDPE) Pipe and Fittings: Use ASTM F 405 for pipes three (3") to six (6") inches in diameter, inclusive, and ASTM F 667 for pipes eight (8") to twenty-four (24") inches in diameter. Fittings shall be manufacturer's standard type and shall conform to the indicated specification.

B. Pipe Perforations: Water inlet area shall be a minimum of one-half (0.5 in2/lf) square inch per liner foot. Manufacturer's standard perforated pipe which essentially meets these requirements may be substituted with prior approval of the Owner's Representative.

C. Slotted Perforations in Plastic Pipe: Circumferential slots shall be cleanly cut so as not to restrict the inflow of water and uniformly spaced along the length and circumference of the tubing. Width of slots shall not exceed 1/8 inch nor be less than 1/32 inch. The length of individual slots shall not exceed 1-1/4 inches on three (3") inch diameter tubing, ten (10%) percent of the tubing inside nominal circumference on four (4") to eight (8") inch diameter tubing, and 2-1.2 inches on ten (10") inch diameter tubing. Rows of slots shall be symmetrically spaced so that they are fully contained in two (2) quadrants of the pipe. Slots shall be centered in the valleys of the corrugations of profile wall pipe.

2.2 PRECAST STRUCTURES

A. The material to be used in the construction of detention chambers, storm manholes, catch basins and drop inlets shall conform to State of Massachusetts DOT Standard Specifications and to the following requirements.

B. Precast Concrete Manholes and Catch Basins: ASTM C478, eccentric cone, flat slab precast top; precast riser section and monolithic base section, with integral floor.

C. Concrete Compressive Strength: 4000 psi minimum. Type II cement.

D. Reinforcing Steel: ASTM A185, 0.12 sq. in./linear ft. and 0.12 sq. in. (both ways) base bottom.

E. Joints sealed with rubber gaskets, conforming to ASTM C443.

F. Steps: Forged 6061B, T6 aluminum or Copolymer Polypropylene Plastic, with 1/2 inch Grade 50 steel reinforcement.

2.3 CAST IRON FRAMES AND COVERS

A. Concrete Catch Basins: To be heavy duty C.I. and manufactured in the United States.

B. Concrete Drain Manholes: To be heavy duty C.I. and manufactured in the United States.

C. Nyloplast Manholes and Catch Basins: To be in accordance with the manufacturer's standard specifications.

2.4 MASONRY MATERIAL

A. Concrete Masonry Units: ASTM C139.

B. Brick: ASTM C32, Grade MS or ASTM C62, Grade SW.

C. Mortar: ASTM C270, Type M.

2.5 PIPE BEDDING AND COVER MATERIALS

A. Bedding for drainage pipe: as specified in Section 31 2000 - Earth Moving.

B. Cover for drainage pipe: as specified in Section 31 2000 - Earth Moving.

C. Aggregate Materials

1. Aggregate for embedding and filling trench drain areas, referred to as "washed stone" or "peastone" shall be washed stone fill consisting of washed, durable, crushed rock free from fine sand, silt, or rock flour. Gradation shall conform to the following:

Sieve Size	% Passing by Weight
3/4-inch	100
1/2-inch	90-100
3/8-inch	40-70
No. 4	0-15
No. 8	0-5

2.6 FILTER FABRIC

A. Filter fabric for wrapping trenches shall be a non-woven, polypropylene fabric made specifically for use in subsurface drainage structures and equal to Mirafi 14ON, manufactured by Mirafi, Inc., Charlotte, NC 28224.

2.7 FLAT PANEL DRAINS

A. Flat panel drains shall be Multiflow (6”) as manufactured by Varicore Technologies, Inc., P.O. Box 131, Prinsburg, MN 56281, or approved equal. All connections for proposed flat panel drains must be completed using manufacturer’s approved connectors. The flat panel drains must be mechanically connected to the collector pipe by the Corru-Tap (6 CTH) as manufactured by Varicore Technologies, Inc. or approved equal.

2.8 POLYMER TRENCH DRAINS

A. Polymer trench drains shall be ACO system 4,000 or 2,000, per plans, with 4.65" depth neutral channel sections and Polyethelene grate as manufactured by ACO Polymer Products, Inc., 12080 Ravenna Road, Chardon, OH 44024 or approved equal.

B. Drain grates for trench drains shall be black polypropylene, UV stabilized, ADA compliant grates with 'quik loc' locking mechanism, or approved equal

C. Catch basins for trench drain system shall be ACO trench drains intended for use with system 4,000.

1. Provide matching black grate and locking mechanism for system 4,000 trench drains
2. Provide plastic trash bucket for all catch basins. Provide oval to round invert adapters where required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that the trench cut and excavation base is ready to receive work and excavations, dimensions and elevations are as indicated on the contract drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with gravel borrow, in accordance with Section 312000 – Earth Moving.

B. Remove large stones or other hard matter that could damage piping or impede consistent backfilling or compaction.

3.3 EXCAVATION AND BEDDING FOR DRAIN SYSTEMS

A. All piping shall be installed in strict conformance with the manufacturer's recommendations. If these specifications conflict with the manufacturer's recommendations, the Subcontractor shall request direction prior to installation.

B. Trenching and excavation, including the removal of rock and unstable material, shall be in accordance with Section 312000 – Earth Moving. Bedding material shall be placed in the trench, as indicated or as required, as replacement for materials in those areas where unstable materials were removed. Compaction of the bedding material shall be as specified.

C. Thoroughly compact backfill around all drainage structures and within all trenches in accordance with Section 312000 – Earth Moving. Properly Backfill and compact in lifts as specified to prevent future settlement.

3.4 INSTALLATION OF FILTER FABRIC

A. One layer of filter fabric shall separate existing soil and crushed stone fill and shall be used on the top, bottom and all sides. The fabric shall be secured in such a manner that backfill material will not infiltrate through any fabric overlaps.

B. Filter fabric shall be installed along slopes where drainage pipes outlet. Fabric shall be pinned and secured with rip-rap.

C. Trenching Lining and Overlaps: Trenches to be lined with filter fabric shall be graded to obtain smooth side and bottom surfaces, so that the fabric will not bridge cavities in the soil or be damaged by projecting rock. The fabric shall be laid flat, but not stretched on the soil, and it shall be secured with anchor pins. Overlaps shall be at least twelve (12") inches and anchor pins shall be used along the overlaps.

3.5 INSTALLATION OF HDPE PIPE

A. Pipe Laying: Each pipe shall be carefully inspected before it is laid. Any defective or damaged pipe shall be rejected. No pipe shall be laid when the trench conditions or weather is unsuitable for such work. Water shall be removed from any trenches by sump pumping or other approved methods. The pipe shall be laid to the grades and aligned, as indicated. The pipe shall be bedded to the established grade line. Pipes of either the bell-and-spigot type or the tongue-and-grove type shall be laid with the bell or groove ends upstream. All pipes in place shall be approved before backfilling.

B. Jointings: HDPE drainage pipe shall be installed in accordance with the manufacturer's specifications and as specified herein. A pipe with physical imperfections shall not be installed. No more than five (5%) percent stretch in a section will be permitted.

3.6 INSTALLATION OF TRENCH DRAINS

A. Install trench drains per detail, and per manufacturer's instructions. Install drains true to line and grade, level at given elevations as shown on plan.

B. Install concrete and steel reinforcement per details, use concrete vibrators to ensure that concrete is distributed evenly underneath drain sections.

C. Replace all trench drain sections damaged by construction activities.

3.7 CONCRETE DRAINAGE STRUCTURES

A. Shall be designed to be non-buoyant.

B. Form bottom of excavation; clean and smooth to correct elevation.

C. Install and level precast concrete sections, with provision for storm drainage pipe and section.

D. Establish elevations and pipe inverts for inlets and outlets, as indicated.

E. Mount frame and cover level in grout, secured to top cone section, to elevations indicated.

F. Adjust and set existing manhole covers to new grade.

3.8 TESTS

A. Request inspection from the Site Engineer prior to and immediately after placing aggregate cover over pipe.

B. Compaction testing will be performed in accordance with ASTM D1557.

C. If tests indicate the work does not meet the specified requirements; remove work, replace and retest at no cost to the Owner.

D. Frequency of tests will be as directed by the Engineer and/or Owner.

E. Pipe Test: Strength tests of pipe shall conform to field service test requirements of Federal Specification, ASTM specification, or AASHTO specification covering the product.

3.9 DAMAGE TO OTHER WORK

A. This Subcontractor shall be held responsible and shall pay for all damage to other work caused by his work or workmen. Repairing of such damage shall be done by this Subcontractor who installed the work, as directed by the Engineer.

3.10 IMPROPER WORKMANSHIP

A. All work under this section of the specifications found to be improper or of poor workmanship shall be removed, repaired and/or replaced to the satisfaction of the Engineer, at no additional expense to Architect or the Owner.

3.11 CLEAN-UP

A. All debris created by this work shall be cleaned up and disposed of, off-site, in accordance with Specification Section 01 7419 - Cleaning Up.

1. Separate recyclable waste from other waste trash and debris generated.
2. Clean all contaminated recyclable waste to make it acceptable for recycling.
3. Remove from the site all excess liquids or chemicals used during construction.
4. Deposit material in the appropriate container.

B. Upon completion of the work in this section, all staging, planking, equipment and excess materials shall be removed from the site.

3.12 GUARANTEE

A. Earthwork shall be guaranteed for a period of one year from the date of substantial completion against defects in workmanship or materials and will be replaced or repaired, at no cost to Engineer or the Owner, if such defects occur.

END OF SECTION

G:\718290\02 Design\specs\Division 33 - Utilities\33 41 00 - Storm Utility Drainage Piping.docx

ATTACHMENT A

Martin

Geo-Environmental, LLC

Drilling Contractors

P.O. Box 646
Belchertown, MA 01007 Tel: (413) 323-8700

Boring #: B-1 Start: 8-24-2020 Finish: 8-24-2020

Sheet: 1 of 1

Client: Wilmington DPW Inspector: K.W. (Gale Ass.)

Project: Tennis Court Borings #

Location: Shawsheen School Wilmington MA

Well Locus: _____

Drill/Crew: J.M.

Auger 4.25 ID	Casing Size	Sampling As Directed	Core Barrel	Utility Clearance #: 20203409711 Town Permit #:

Sample No.	Depth Range	Blows per 6 " 0-6	6-12	12-18	18-24	REC.	Strata Change	Sample Descriptions
								12" ASPHALT
S-1	1-3'	8	13	12	14	15"		Gray fine-medium SAND, little gravel, little silt. (pulverized
								rock fragments in spoon) DRY
								Auger Refusal 3' OFFSET 5'
S-2	5-7'	4	1	3	1	4"		0-3" Gray fine-medium SAND, some silt, little gravel, 3-4"
								wood. DRY
S-3	10-	13	21	23	16	13"		Gray/brown fine-coarse SAND and GRAVEL, little silt. WET
	12'							
S-4	15-	18	30	31	50/2"	15"		Gray SILT and fine SAND, trace gravel WET (till)
	17							
								EOB 17' Water @ 5-6'

Portions Used
Trace: 0-10%
Little: 10-20%
Some: 20-35%
And: 35-50%

Location: Tennis Courts

Weather: high 80s sunny

Rig: Geoprobe 6620

Hammer: Auto Hammer

Martin

Geo-Environmental, LLC

Drilling Contractors

P.O. Box 646
Belchertown, MA 01007 Tel: (413) 323-8700

Boring #: B-2 Start: 8-24-2020 Finish: 8-24-2020

Sheet: 1 of 1

Client: Wilmington DPW Inspector: K.W. (Gale Ass.)

Project: Tennis Court Borings #

Location: Shawsheen School Wilmington MA

Well Locus: _____

Drill/Crew: J.M.

Auger 4.25 ID	Casing Size	Sampling As Directed	Core Barrel	Utility Clearance #: 20203409711 Town Permit #:

Sample No.	Depth Range	Blows per 6 " 0-6	6-12	12-18	18-24	REC.	Strata Change	Sample Descriptions
								10" ASPHALT
S-1	1-3'	6	8	7	8	14"		Brown fine-medium SAND, some silt, little gravel. DRY
S-2	5-7'	4	8	8	8	20"		Gray SILT and fine SAND. WET
S-3	10-12'	26	23	18	16	12"		Brown/gray fine-coarse SAND and GRAVEL, little silt. WET
S-4	15-17	4	8	8	9	8"		Gray/brown fine-coarse SAND and SILT, little gravel. WET
								EOB 17' Water @ 5'

Portions Used
Trace: 0-10%
Little: 10-20%
Some: 20-35%
And: 35-50%

Location: Tennis Courts

Weather: high 80s sunny

Rig: Geoprobe 6620

Hammer: Auto Hammer

Martin

Geo-Environmental, LLC

Drilling Contractors

P.O. Box 646
Belchertown, MA 01007 Tel: (413) 323-8700

Boring #: B-3 Start: 8-24-2020 Finish: 8-24-2020

Sheet: 1 of 1

Client: Wilmington DPW Inspector: K.W. (Gale Ass.)

Project: Tennis Court Borings #

Location: Shawsheen School Wilmington MA

Well Locus: _____

Drill/Crew: J.M.

Auger 4.25 ID	Casing Size	Sampling As Directed	Core Barrel	Utility Clearance #: 20203409711 Town Permit #:

Sample No.	Depth Range	Blows per 6 "				REC.	Strata Change	Sample Descriptions
		0-6	6-12	12-18	18-24			
								8" ASPHALT
S-1	1-3'	5	6	8	10	18"		0-7" Gray/brown fine-medium SAND. 7-18" black fine-medium
								SAND and SILT. DRY
S-2	5-7'	4	7	8	13	17"		Gray fine-medium SAND, little silt. WET
S-3	10-	15	14	15	13	5"		Gray/brown fine-coarse SAND and SILT, trace gravel. WET
	12'							
S-4	15-	14	16	16	17	15"		Gray fine-medium SAND and SILT, trace gravel. WET
	17							
								EOB 17' Water @ 5'

Portions Used
Trace: 0-10%
Little: 10-20%
Some: 20-35%
And: 35-50%

Location: Tennis Courts

Weather: high 80s sunny

Rig: Geoprobe 6620

Hammer: Auto Hammer

Martin

Geo-Environmental, LLC

Drilling Contractors

P.O. Box 646
Belchertown, MA 01007 Tel: (413) 323-8700

Boring #: B-4 Start: 8-24-2020 Finish: 8-24-2020

Sheet: 1 of 1

Client: Wilmington DPW Inspector: K.W. (Gale Ass.)

Project: Tennis Court Borings #

Location: Shawsheen School Wilmington MA

Well Locus: _____

Drill/Crew: J.M.

Auger 4.25 ID	Casing Size	Sampling As Directed	Core Barrel	Utility Clearance #: 20203409711 Town Permit #:

Sample No.	Depth Range	Blows per 6 "				REC.	Strata Change	Sample Descriptions
		0-6	6-12	12-18	18-24			
								10" ASPHALT
S-1	1-3'	10	8	10	4	10"		0-6" Gray fine-medium SAND, some silt, little gravel. 6-10"
								WOOD. DRY
S-2	5-7'	9	8	5	6	15"		0-7" Gray SILT and fine SAND, trace gravel. DRY 7-15"
								Brown fine SAND and SILT, little medium sand, trace gravel.
								WET
S-3	10-	19	7	7	15	12"		Tan fine SAND and SILT, trace gravel. WET
	12'							
S-4	15-	30	27	27	32	18"		Gray SILT and fine SAND. WET (till)
	17							
								EOB 17' Water @ 6'

Portions Used
Trace: 0-10%
Little: 10-20%
Some: 20-35%
And: 35-50%

Location: Tennis Courts

Weather: high 80s sunny

Rig: Geoprobe 6620

Hammer: Auto Hammer