Division 1

General Requirements

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of the Contract as shown on a set of plans entitled:

TOWN OF WILLIAMSTOWN
SOUTH STREET RECONSTRUCTION PROJECT 2025
Williamstown, Massachusetts

January 8, 2025

GUNTLOW & ASSOCIATES, INC.
CONSULTING ENGINEERS
55 North Street, Williamstown, Massachusetts 01267

B. The project includes removal and replacement of approximately 2,800 LF (10,745 SY) of pavement, installation of new curbing, new storm drain structures and piping, new sanitary sewer structures and piping and related appurtenant work associated to construction of a new 5' sidewalk (1,260 LF) along the east side of South Street and Rectangular Rapid Flashing Beacons (2 each at 2 crossings – 4 total). Contractor is responsible for phasing the work in order to provide necessary temporary traffic control throughout the duration of construction. All work needs to be completed within 329 business days from the date of the Notice to Proceed.

1.02 WORK INCLUDED

A. Work includes:

1. Sawcutting pavement at project limits, remove existing pavement, furnish and install gravel base course, reset valve covers, remove and replace drain and sewer piping and structures, installing new concrete sidewalk / curbing, pavement patching, pavement markings, and furnish & install catch basin. Work also includes all the necessary traffic control to manage traffic flow safely until work is complete.

1.03 CONTRACTOR USE OF PREMISES

A. CONTRACTOR cannot make use of any private property, without the written consent of the OWNER, a copy of which must be furnished to the Engineer.

B. CONTRACT must limit his construction activity to the Road rights-of-way. Any construction activity beyond will be a trespass, at the CONTRACTOR's risk.

C. The CONTRACTOR may request to the Town, for their approval, to close the road for very limited periods at least two days in advance of the scheduled work. Police may be required for traffic control as determined by the situation by the Town and Police.

1.04 ABBREVIATIONS AND REFERENCES

AASHTO	-	The American Association of State Highway and Transportation Officials
ACI	-	The American Concrete Institute
AISC	-	The American Institute of Steel Construction

AISI	-	The American Iron and Steel Institute
ANSI	-	The American National Standards Institute
API	-	The American Petroleum Institute
ASCE	-	The American Society of Civil Engineers
ASME	-	The American Society of Mechanical Engineers
ASTM	-	The American Society of Testing and Materials
AWWA	-	The American Water Works Association
DIPRA	-	The Ductile Iron Pipe Research Association
Recd	-	Farmers Home Administration
IEEE	-	Institute of Electrical and Electronic Engineers
NEMA	-	National Electrical Manufacturer's Association
OSHA	-	Occupational Safety and Health Administration

It is understood that when the specifications refer to publications and standards throughout the text that the latest revision shall apply. If a conflict exists, the latest revision shall take precedence over these Specifications.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 BASE BID (ITEM 1)

A. MEASUREMENT

1. The work is on a lump sum basis for the complete site work package, including but not limited to: saw cutting pavement, removing existing pavement and curbing, furnishing and installing gravel base course, drainage improvements, resetting valve covers, pavement patching, pavement markings, wetland replication, landscape cleanup and new sidewalk/curb construction. Work also includes all the necessary traffic control to manage traffic flow safely until work is complete.

B. PAYMENT

1. Payment of the lump sum bid for the complete site work package, as described in the Contract Drawings shall include all labor, equipment and materials related thereto.

1.02 REMOVE & DISPOSE OF EXISTING PAVEMENT (ITEM 2)

A. MEASUREMENT

1. Measurement shall be actual cubic yard of pavement removed and disposed of properly offsite where shown on the plans and/or directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.03 EXCAVATE AND STOCKPILE TOPSOIL/EARTH (ITEM 3)

A. MEASUREMENT

1. Measurement shall be actual square yard of topsoil / earth removed and stockpiled onsite where shown on the plans and/or directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.04 REMOVE & DISPOSE OF EXISTING CURB (ITEM 4)

A. MEASUREMENT

1. Measurement shall be actual linear foot of curbing removed and disposed of properly offsite where shown on the plans and/or directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.05 HAUL & DISPOSE OF EXCESS EARTHWORKS (ITEM 5)

A. MEASUREMENT

1. Measurement shall be actual cubic yardage of excess earthworks removed and disposed of properly offsite where shown on the plans and/or directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.06 SAW CUT PAVEMENT (ITEM 6)

A. MEASUREMENT

1. Measurement shall be actual linear foot cut where shown on the plans and/or directed by the Engineer and shall include all transition areas from new pavement to existing pavement.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.07 MISC. BITUMINOUS CONCRETE PAVEMENT PATCHING (ITEM 7)

A. MEASUREMENT

1. Measurement shall be for each ton of pavement patching placed and shall include subbase preparation, tack coat, bituminous concrete, placement, compaction and all other labor, equipment and other appurtenant work required for providing a satisfactory pavement overlay to match existing pavement or finished grade elevations with smooth line and grade where shown on the plans or indicated by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.08 BITUMINOUS CONCRETE PAVEMENT (ITEM 8)

A. MEASUREMENT

1. Measurement shall be for each ton of pavement placed and shall include subbase preparation, tack coat, providing the bituminous concrete, placement, compaction and all other labor, equipment and other appurtenant work required for providing a satisfactory pavement.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.09 GRAVEL SUBBASE FOR ROADWAY (ITEM 9)

A. MEASUREMENT

1. Measurement shall be for each cubic yard of import gravel subbase for roadway and shall include providing the gravel, preparation, placement, compaction and all other labor, equipment and other appurtenant work required for providing a satisfactory pavement.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.10 PAVEMENT STRIPING (ITEM 10)

A. MEASUREMENT

1. Measurement shall be for actual linear foot of line installed where shown on the plans and/or directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or are reduced by the OWNER.

1.11 FURNISH & INSTALL 4’ DIA. CATCH BASIN - INCL. FRAME & GRATE (ITEM 11)

A. MEASUREMENT

1. Measurement shall be for each new structure, frame and cover provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.12 FURNISH & INSTALL 3’X3’. CATCH BASIN - INCL. FRAME & GRATE (ITEM 12)

A. MEASUREMENT

1. Measurement shall be for each new structure, frame and cover provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.13 FURNISH & INSTALL DMH - INCL. FRAME & COVER (ITEM 13)

A. MEASUREMENT

1. Measurement shall be for each new structure, frame and cover provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.14 FURNISH & INSTALL SMH - INCL. FRAME & COVER (ITEM 14)

A. MEASUREMENT

1. Measurement shall be for each new structure, frame and cover provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.15 FURNISH & INSTALL12” HDPE DRAIN PIPE (ITEM 15)

A. MEASUREMENT

1. Measurement shall be for each linear foot provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.16 FURNISH & INSTALL15” HDPE DRAIN PIPE (ITEM 16)

A. MEASUREMENT

1. Measurement shall be for each linear foot provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.17 FURNISH & INSTALL18" HDPE DRAIN PIPE (ITEM 17)

A. MEASUREMENT

1. Measurement shall be for each linear foot provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.18 FURNISH & INSTALL 24" HDPE DRAIN PIPE (ITEM 8)

A. MEASUREMENT

1. Measurement shall be for each linear foot provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.19 FURNISH & INSTALL 30" HDPE DRAIN PIPE (ITEM 19)

A. MEASUREMENT

1. Measurement shall be for each linear foot provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.20 FURNISH & INSTALL 6" PVC SEWER PIPE (ITEM 20)

A. MEASUREMENT

1. Measurement shall be for each linear foot provided and installed as shown on the plans and/or directed by the Engineer and shall include all labor, materials and equipment as necessary to complete the work.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

1.21 CEMENT CONCRETE SIDEWALK, NEW (ITEM 21)

A. MEASUREMENT

1. Measurement shall be by square yard of sidewalk installed and shall include furnishing, installing and compaction of gravel base, forming, reinforcement, concrete, finishing and all labor, equipment and other appurtenant work required for providing satisfactory sidewalk as shown on the plans or directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER.

1.22 CURBING (ITEMS 22 & 23)

A. MEASUREMENT

1. Measurement shall be by linear foot of curb installed and shall include furnishing, installing and compaction of gravel base, forming, reinforcement, concrete, finishing and all labor, equipment and other appurtenant work required for providing satisfactory sidewalk as shown on the plans or directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER.

1.23 TEMPORARY TRAFFIC CONTROL (ITEM 24)

A. MEASUREMENT

1. This unit is for each day of operation where police officers, devices and equipment are placed to guide traffic and protect the work site and shall include all appurtenant equipment, etc. as necessary to safely direct traffic through the work site or as directed by the Engineer.

B. PAYMENT

1. The supplemental unit prices shall only be used to adjust the Lump Sum Bid Prices should additional work be directed by the OWNER or if certain work or quantities are reduced by the OWNER.

END OF SECTION

SECTION 01026

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Schedule of Values - Provide a detailed balanced breakdown of the Lump Sum Bid showing values for the various portions of the work. The schedule of values shall be submitted within ten (10) calendar days after the date of the Notice of Award and prior to the signing of the Contract.

PART 2 - PRODUCTS

2.01 SCHEDULE OF VALUES

A. Submit three (3) copies of a detailed breakdown of the elements of the work accompanied by their associated monetary values.

B. The Engineer will determine the level of breakdown and detail required. The Contractor shall submit additional information when requested. The final document will be the basis of payment requests for the duration of the Contract.

END OF SECTION

SECTION 01046

CONTROL OF WORK

PART 1 - GENERAL

1.01 PLANT

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

1.02 PRIVATE LAND

A. The CONTRACTOR shall not enter or occupy private land, except by written permission of the land owner.

1.03 PIPE LOCATIONS

A. Pipelines shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the CONTRACTOR's convenience and does not relieve him from laying and jointing different or additional items where required.

1.04 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The CONTRACTOR shall, at his own expense, provide suitable and safe bridges, plates, and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, the Engineer may require special construction procedures such as limiting the length of the open trench or requiring that the trench shall not remain open overnight.

B. The CONTRACTOR shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.

1.05 MAINTENANCE OF ACCESS

A. All excavated material shall be placed so that vehicular and universally accessible pedestrian traffic is maintained at all times during normal business hours. If the CONTRACTOR’s operations cause hazards, he shall repair the surfaces, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.

B. The CONTRACTOR shall take precautions to prevent injury to the public due to open trenches. The CONTRACTOR shall be fully responsible for damage or injuries whether or not traffic officers have been provided.

1.07 CARE AND PROTECTION OF PROPERTY

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

B. Along the location of this work, bushes, trees, shrubbery, and other physical features shall be protected and replaced or restored to their original condition. All grassed areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and seeded.

C. Trees and underbrush close to the work shall be boxed or otherwise protected against injury throughout construction. The CONTRACTOR shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior approval by the OWNER. Dead plant materials and broken limbs shall be pruned as directed by the Engineer.

D. Prior to starting construction, the CONTRACTOR shall, for his own protection, photograph existing conditions. Coverage shall include the entire construction area and sufficient distance beyond to encompass all possible disturbed areas. Note particular areas of existing damage to structures, plantings, pavement, etc.

1.08 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The CONTRACTOR shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, mailboxes, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, electric telephone and cable television, whether or not they are shown on the Drawings, The CONTRACTOR shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the CONTRACTOR’s operations shall be repaired by him at his expense.

B. Assistance will be Given the CONTRACTOR in determining the location of existing services, The CONTRACTOR, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the CONTRACTOR.

C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be part of the work under the Contract and all costs in connection therewith shall be considered incidental to the Contract. This work shall include but is not limited to the following: bracing, hand excavation and backfill, and any other work required for crossing the utility or obstruction.

D. If, in the opinion of the Engineer, permanent relocation of a utility owned by the Town is required, he may direct the CONTRACTOR, in writing, to perform the work. Work so ordered will be paid for as extra work as described in the General Conditions. If relocation of a privately owned utility is required, the Town will notify the Utility to perform the work as expeditiously as possible. The CONTRACTOR shall fully cooperate with the Town and

Utility, and shall have not claim for delay due to such relocation. The CONTRACTOR shall notify all utility companies in writing at least seventy-two (72) hours prior to start of Work.

1.09 WATER FOR CONSTRUCTION PURPOSES

A. In location where public water supply is available, the CONTRACTOR will be allowed to use water without charge for construction purposes. A hydrant meter must be obtained from town DPW.

B. The express approval of the TOWN of WILLIAMSTOWN, shall be obtained before water is used. Waste of water by the CONTRACTOR shall be sufficient cause for withdrawing the privilege of unrestricted use. Hydrants shall only be operated under the supervision of the Town's personnel.

1.10 MAINTENANCE OF FLOW

A. The CONTRACTOR shall at his own cost, provide for the flow or sewers, drains and water courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter, The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow.

1.11 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with General Contractor and his Subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

1.12 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the Work, the CONTRACTOR shall keep the site of his operations in as clean and neat a condition as is possible, He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

B. The CONTRACTOR shall, during the course of the Work, ensure that all existing site construction debris and residue off site.

C. In order to prevent environmental pollution arising from the construction activities related to the performance of the Contract, the CONTRACTOR and his subcontractors shall comply with all applicable Federal, State and local laws, and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and elsewhere in the Specifications.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

This section specifies the general methods, formats, and requirements for the submission of the following Work and Product related documentation:

A. Product Listing and Manufacturer's Qualifications

B. Shop Drawings

C. Product Data

D. Samples

E. Certificates of Compliance

1.02 RELATED SECTIONS

A. Documents affecting work of the Section include, but are not necessarily limited to the General Conditions, Supplementary Conditions and all Sections in Division 1 of these Specifications.

1.03 MEASUREMENT AND PAYMENT

A. No separate measurement and payment will be made for work in this Section. All costs in connection therewith shall be considered incidental to the Lump Sum Bid Price.

1.04 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

A. SHOP DRAWINGS

1. Shop drawings, as defined in the General Conditions, and as specified in individual Work Sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation drawings, schedule information, piece part drawings, actual shop work manufacturing instructions, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certification, as to the Work.
2. All Shop Drawings submitted by Suppliers for approval shall be sent directly to the CONTRACTOR for preliminary checking. The CONTRACTOR shall be responsible their submission at the proper time so as to prevent delays in delivery of materials. The CONTRACTOR shall be solely responsible for the coordination of submittals for related or interdependent equipment; fragmented submittals will not be accepted for review by the Engineer. The CONTRACTOR shall advise the Engineer in writing of any deviations from the requirements of the Contract Documents.
3. The CONTRACTOR shall check all Shop Drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Drawings found to be inaccurate, not in compliance, or otherwise in error shall be returned to the subcontractors for correction before submission to the Engineer. Drawings which are current shall be marked with the date, name and approval stamp of the CONTRACTOR. The

CONTRACTOR shall advise the Engineer, in writing, of any deviations from the requirements of the Contract Documents.

4. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made by the CONTRACTOR and noted on the drawings before being submitted to the Engineer for review and approval.
5. No Material or Equipment shall be purchased or fabricated especially for the Contract until the required Shop and Working Drawings have been submitted as here in above provided and approved as conforming to the Contract Documents. All such materials and equipment and the work involved in their installation or incorporation into the work shall then be as shown in and represented by said Drawings.
6. The Engineer's approval of Shop and Working Drawings, calculations, etc., will be general only and shall not relieve or in any respect diminish the responsibility of the CONTRACTOR for details of design, dimensions, etc. necessary for proper fitting and construction of the Work as required by the Contract and for achieving the result and performance specified thereunder.
   Should the CONTRACTOR submit for approval equipment that requires modifications to the structures, piping, layout, etc. detailed on the Drawings, he shall also submit for approval details of the proposed modifications. If such equipment and modifications are approved, the CONTRACTOR, at no additional cost to the OWNER, shall do all work necessary to make such modifications

B. PRODUCT DATA

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

1.05 CONTRACTOR'S RESPONSIBILITIES

A. Review Shop Drawings, Product Data and Samples prior to submission and verify and determine:

1. Field Measurements
2. Conformance with Specifications. The CONTRACTOR shall advise the Engineer in writing of any deviations from the requirements of the Contract Documents.

B. Provide Submittal Identification and Information including: the date of submission and dates of previous submissions, project title, contractor identification, specification section, manufacturer and supplier, identified field dimensions, applicable standards and identification of deviations from Contract Requirements.

C. Provide digital submission of Shop Drawings and Product Data electronically (.pdf file format),.

D. Apply CONTRACTOR’s stamp, initials, or signature certifying that the submission has been thoroughly reviewed for the completeness, compliance with Contract Requirements,

coordination with adjacent construction and dimensional compatibility, Item submitted without the stamp, or incomplete, will be returned by the Engineer for rework and resubmission.

E. List any deviations from Contract Documents and Product or System Limitations which may be detrimental to successful performance of the work.

F. Space will be provided for the Engineer's review stamps and comments. The Engineer will review Shop Drawings for design, methods of construction and detailing. This review will not be assumed as a complete check nor does it relieve the CONTRACTOR from responsibility for any departures or deviations from the requirements of the Contract Documents unless he has, in writing, calling the Engineer's attention to such deviation at the time of its submission. The Engineer's review of the Shop Drawings does not relieve the CONTRACTOR from the responsibility of proper fitting of the work, or the responsibility of furnishing any work required by the Contract Documents which may not be indicated on the Shop Drawings. The CONTRACTOR is solely responsible for any quantities shown on the Shop Drawings.

G. A detailed transmittal form will accompany each submission listing the Project name and Submittal Specification Section. The transmittals will be numbered consecutively and dated. Any resubmittals will show the original transmittal number, commencing with the suffix "A".

H. All changes made on resubmittals will be clearly identified.

I. All copies of reviewed submittals should be immediately distributed to appropriate parties requesting prompt notice of any inability to meet the provisions and requirements of the work.

1.06 GENERAL PROCEDURES FOR SUBMISSION AND RESUBMISSION OF SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. COORDINATION – Prepare and submit documentation in advance of fabrication and product manufacture, so that the installation will not be delayed, other related work can be properly coordinated, and there is adequate time for review and resubmission, if required. No extension of time will be authorized due to the CONTRACTOR's failure to provide approval submittals sufficiently in advance of the work.

B. RESUBMISSION – Make corrections and modifications required by the Engineer and resubmit until approved. Clearly identify changes made to Shop Drawings and product data and indicate other changes which have been made other than those requested by the Engineer.

C. DISTRIBUTION – Distribute approved Submittal Shop Drawings and approved Submittal Product data to the Project site and elsewhere as required to communicate the information to suppliers, CONTRACTORS and field personnel.

1.07 CERTIFICATES OF COMPLIANCE

A Provide sworn certificates from the manufacturer or material supplier that the materials and fabrications provided under the Section conform with the pertinent plans, special provisions and Specification of the Contract and processing, product testing and inspection of materials are in conformance with all applicable Specifications, Drawings and/or Standards of the Articles furnished. Certificates of Compliance shall be submitted in triplicate when requested by the Engineer or required by the individual Sections of the

Specification. Certificates shall be signed by an officer of the Corporation and witnessed by a Notary Public.

1.08 SUBSTITUTIONS

A. It will be assumed by the OWNER that the CONTRACTOR has prepared his Bid on the basis of the specified materials and equipment.

B. If the CONTRACTOR should at any time, wish to make substitutions in materials and/or equipment, he shall submit to the Engineer a written request for such substitution and state the advantage to the OWNER.

C. The CONTRACTOR shall also state the additional cost or savings to the OWNER and include such cost analysis, comparisons and quotations as are pertinent. The determination as to whether or not such substitutions will be permitted rests solely with the OWNER. All substitutions allowed by the OWNER will be authorized in writing by the Engineer acting at the direction of the OWNER.

END OF SECTION

SECTION 01666

PIPE AND STRUCTURE LEAKAGE TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section covers the requirements for performing leakage tests on site pipelines, manholes, subsurface tanks, and appurtenances, and is one of the several bases for acceptance of Work.

B. All site pressure pipes, non-pressure pipes, sanitary manholes, subsurface tanks, drainage basins and appurtenances shall be tested for leakage.

1.3 QUALITY ASSURANCE

A. Prior to final acceptance of the Work, all pressure pipes, non-pressure pipes, sanitary manholes, and appurtenances shall meet specific leakage requirements. These leakage requirements must be satisfied by the basic materials alone. Where joint fillers and the like have been specified, primarily to protect jointing materials, and secondarily to provide a factor of safety, they shall not be applied until after leakage tests have been completed and have been accepted by Engineer.

B. Every test must be witnessed by Engineer or Owners Representative and any test not so witnessed will be considered as not having been performed. Contractor shall pretest the Work and shall not request Engineer or Owners Representative to witness the final test until he is reasonably certain that the test will yield results within the acceptable limits.

1.4 SUBMITTALS

A. Complete details and specifications on testing apparatus.

B. Certified test results on forms approved by Engineer.

1.5 SEQUENCING AND SCHEDULING

A. Notify Engineer or Owners Representative at least 48 hours in advance of a scheduled test so that the test may be witnessed.

PART 2 - PRODUCTS

2.1 TESTING APPARATUS

A. Provide all labor, pumps, plugs, measuring equipment and other apparatus, complete, and as necessary to perform all testing.

B. Provide clean water, air, nitrogen and other material as necessary to accomplish all testing.

C. Provide plugs and caps capable of withstanding the test pressures.

D. Provide all temporary flanges, plugs, bulkheads, thrust blocks, weighting, bracing and other items necessary to prevent joints from separating, and to prevent any injuries or damage.

E. Monitoring air pressure gauge shall have a range of 0-10 psi, divisions of 0.10 psi, and accuracy of 0.05 psi+.

PART 3 - EXECUTION

3.1 PREPARATION

A. Pipe Displacement Tests – Provide one person to assist Engineer or Owners Representative in conducting pipe displacement tests prior to performing leakage tests.

B. Manhole Inspections – Given ample notice, Engineer or Owners Representative will conduct his inspection of manholes prior to the performance of leakage tests. If the inspections are not completed before leakage testing, and subsequent modifications are made to a manhole, the manhole shall be retested for leakage.

C. Bracing Pressure Piping – Plug open ends, adequately block bends, tees, ends, and other fittings, and do whatever is necessary to brace the piping system so that it will safely withstand the pressure developed under the tests and so that no damage or injury will occur to the pipeline, people or property.

D. Protection – Before tests are conducted, isolate or remove any regulator, gauge, trap, or other apparatus or equipment which may be damaged by test pressures.

E. Flushing – Flush all piping systems, except air piping, with water prior to testing.

3.2 GENERAL

A. Trapped Air – Trapped air may cause a false indication of the rate of leakage during exfiltration testing. Points of concern include ends of lines, stubs, service connections and high points in pipe lines. No credit will be made for this condition and no adjustment will be made to the allowable leakage. Where trapped air is suspected of causing a test failure, do whatever is necessary to evacuate the air and repeat the tests until the actual leakage is equal to or less than the allowable rate of leakage.

B. Water Absorption – No credit will be given for absorption of water in pipe and manhole walls. If necessary, fill pipes and manholes with water well in advance of exfiltration testing and allow them to soak in order to eliminate or minimize the effects of absorption.

C. Evaporation – Precipitation – Where tests may be affected by the elements, provide a watertight container, acceptable to Engineer, which will be used to measure and estimate the effects of evaporation and precipitation.

D. Exfiltration Tests (Tanks) – Leakage shall be determined by exfiltration testing. Engineer reserves the right to require infiltration testing.
   1. Determine groundwater levels by installing test holes, test pits, or perforated observation wells fitted with screens at the bottom.
   2. Fill structures to be tested to 12 inches above their maximum operating levels, except where weirs control the depth, and then to the maximum weir setting.

3.3 TESTS FOR NON-PRESSURE PIPING

A. General
   1. Leakage shall be determined by air testing or exfiltration testing. Engineer reserves the right to require infiltration testing.
   2. Leakage testing shall include the main non-pressure pipe, new house connections, and all other appurtenances on the section of pipeline being tested.
   3. Generally limit pipeline test sections to runs between adjacent structures. Manholes may be tested simultaneously with pipes when using exfiltration testing.
   4. Adequately plug ends of all house connections, stubs and all other openings from which air or water may escape.
   5. Use clean water for exfiltration tests.
   6. All pipe trench shall be backfilled prior to performing testing procedures.

B. Exfiltration Test on Pipes Only
   1. The minimum water level required for testing is the higher of either 4’ above the crown of the upstream (highest) end of the pipe being tested or 4’ above the maximum groundwater level along the test section. Where such a water level will be more than 25 feet above the lowest point in the Section being tested, the Engineer will prescribe test modifications or require that other methods of testing be utilized.
   2. Install a watertight plug in the downstream end and a water tight plug in the upstream end fitted with a 2” diameter, clear rigid tube installed in a vertical position to facilitate observation of water levels. Tube shall be long enough to obtain the required head and made of extruded Lucite acrylic, Polycarbonate (Lexan), Tenite butyrate or other plastic material. Glass is unacceptable.

3. Fill pipe with water and let stand for at least four (4) hours and conduct test. Adjust water to reference mark, then continually add water from a graduated container to keep water in tube at a constant level for 60 minutes.
4. Upon satisfactorily completing the test, remove the downstream plug in the presence of Engineer. Do not touch nor remove the upstream plug until approved by Engineer.
5. Allowable exfiltration is 100 gallons/day/inch diameter/mile of pipe.

C. Exfiltration Testing of Pipelines and Manholes
1. Lower groundwater table to below the bottom of the manhole. Install a watertight plug in the pipe at the downstream manhole and another watertight plug(s) in the incoming pipe(s) in the upstream manhole. Fill upstream manhole until water reaches its highest point without overflowing.
2. More than one manhole may be included in a test section, provided that when the lowest manhole is filled, the water level in the other manholes is at least 2' above the highest manhole joint, and the pipe is subjected to at least a 4' differential hydrostatic pressure.
3. Allow at least 4 hours for stabilization. Conduct the test for a minimum of 6 hours. Allowable exfiltration is the allowable pipe exfiltration as specified in subsection 3.03.B.5 plus the allowable manhole exfiltration as specified in Subsection 3.05 E.

D. Infiltration Test
1. The minimum head of groundwater required for infiltration testing is 4' above the crown of the pipe at the upstream end.
2. Infiltration may be measured with an approved graduated container capable of intercepting all inflow, by a pipeline V-notch weir, or by other approved methods. When using in-stream type measuring devices, do not measure flows until steady state conditions are established.
3. Allowable infiltration is same as allowable exfiltration test as specified in Subsection 3.03 B.5.
4. Where groundwater level is at least 2' above the highest manhole joint, manholes may be included in the test. No visible leakage will be permitted in manholes.

E. Air Testing-Pipes Only
1. Install tapped plug at air inlet and airtight plugs at other ends of test section.
2. Connect air supply equipment to tapped plug and fill slowly until a constant pressure of 3.5 psig is maintained.
3. Maintain pressure above 3.0 psig for at least 5 minutes for stabilization of the temperature. Check plugs for leaks.
4. Adjust pressure to 3.5 psig and disconnect air supply.
5. Begin timing pressure drop at 3.0 psig and record time interval for the pressure to drop to 2.5 psig.
6. Increase above pressure to 0.5 psig for each foot groundwater is above invert of the pipe.
7. Minimum time for pressure drop of 0.5 psig shall be 75 seconds per inch diameter.
8. Contractor may conduct water test if air test fails.

3.4 TESTS FOR PRESSURE PIPES

A. General
1. Leakage testing shall include the main pressure pipe, service connections, and all other appurtenances on the section of pipeline being tested.
2. Provide all necessary gauges. Gauges shall be standard pressure type with a minimum 6" diameter dial and a pressure range not in excess of 150% of the maximum required test pressure.
3. Provide and maintain at the site a gauge stand with an approved laboratory calibrated test gauge. Periodically check test gauges used for testing against the test gauge, and whenever requested by Engineer.
4. Where it is absolutely necessary for testing, tap pipes and insert approved plugs after testing is completed. Install air release valves at high points for water testing if hydrants or blow-offs are not available.

5. Provide a hand or motor driven pump to maintain the required test pressure constant throughout the duration of the test. If a water pump is used, install water meter on supply side of pump. If an air or inert gas pump is used, leakage shall be determined and calculated by the cycling of the pump.
6. All concrete thrust blocks and restraints shall be in place and cured at least 7 days. If high early strength concrete is used in the concrete thrust blocks, the hydrostatic pressure can be applied to the main after two (2) days have elapsed from time of construction of the thrust blocks.
7. All buried pipe shall be backfilled.
8. All water main testing shall be in accordance with the requirements of ANSI/AWWA Standard C600.
9. On completion of the pipeline, it is to be filled with water and tested. Water used for this purpose is to be drawn from the existing water system by the CONTRACTOR under the direction of the Engineer's and OWNER's Authorized Representative. Disinfection and bacteria tests shall pass prior to pressurization.
10. On pipelines where the elevation along the route of construction varies substantially, the Engineer reserves the right to valve off and test portions of the line.
11. On extensive construction jobs, the Engineer reserves the right to require the testing of individual portions of the line as construction proceeds rather than await completion of the entire project in order to undertake a pressure or leakage test.
12. Test pressure shall not exceed the rated pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.
13. The CONTRACTOR will be allowed to complete backfilling as previously specified, prior to undertaking the leakage and pressure tests. The carrying out of backfilling prior to the conducting of the necessary tests will be at the option of the CONTRACTOR with the exception of intersections, driveways, crosswalks and other such locations where holding open the trench will adversely affect the public.
14. Pipeline may be subjected to hydrostatic pressure and inspected for leakage at any convenient time after the trench has been partially backfilled. Partial backfilling shall consist of filling along the center of the pipe length and leaving the joint open for inspection.

B. Nongaseous Pipe Hydrostatic Tests
1. Open all air release valves and fill pipe with water at a rate not to exceed venting capacity of the valves.
2. To allow for proper filling, venting, testing, and other necessary tasks, it will be the CONTRACTOR's responsibility to install any corporation stops and/or special fittings which may be required. All such installations will be subject to the approval of the Engineer's and OWNER's Authorized Representative.
3. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all highpoints, the CONTRACTOR shall install corporations at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporations shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporations shall be removed and plugged or left in place at the discretion of the OWNER.
4. Raise pressure to 150 percent of the highest working pressure, or 100 psig, whichever is greater, adjusted to lowest point of the test section. Maintain a minimum of 125 percent of the working pressure at the highest point of the test section. In some instances the lengths of test sections will have to be shortened to meet the above requirements.
5. Maintain pressure for a minimum of two (2) hours.
6. Perform leakage test.
7. Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test.

8. Any damaged or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure tests shall be repaired or replaced with sound material, and the test shall be repeated until it is satisfactory to the Engineer.

C. Nongaseous Pipe Leakage Test
   1. Perform simultaneously with hydrostatic test.
   2. Maintain pressure within a maximum variation of ± 5 psi for 2 hours minimum.
   3. Record amount of leakage from water meter or volumetrically.
   4. Allowable leakage is:
      a. Exposed piping: Exposed piping with flanged, threaded or welded joints, or buried pipe in conflict with potable water lines: No leakage allowed.
      b. Other pipe by the formula:
      c. Leakage is defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof to maintain pressure within five (5) psi of the specified test pressure after the pipe has been filled with water and the air has been expelled. Testing shall include all hydrants and hydrant branches. Leakage shall not be measured by a drop in pressure in a test section over a period of time.
      d. No pipe installation will be accepted if the leakage is greater than that determined by the following formula, or greater than ten (10) gallons per inch diameter per mile of pipe per twenty-four hours, whichever is less:

$$L = \frac{(S)(D)\sqrt{P}}{133{,}200}$$ where:

L=Maximum allowable leakage in gallons per hour.
S=Length of pipe tested, in feet.
D=Nominal internal diameter of the pipe in inches.
P=Average test pressure in pounds per square inch gage.
This formula is based on the allowable leakage of 11.65 gallons per day/mile/inch of nominal diameter at a pressure of 150 psi.

      e. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gallons per hour/inch of nominal valve size shall be allowed.

f.

D. Gas and Air Pipe Test
   1. Install tapped plug at air inlet and airtight plugs at other ends of the test section.
   2. Connect air supply equipment to tapped plug and fill slowly until test pressure is attained. For chlorine gas lines, test with nitrogen. Nitrogen may be used in lieu of air.
   3. Allow ample time for the temperature of the gas and piping to stabilize.
   4. Set pressure to 150 percent of designed operating pressure and maintain a minimum of one hour. Examine all joints for leaks using a concentrated liquid soap or a commercial leak detection preparation.
   5. Allowable leakage is:
      a. Chlorine Gas Lines – No leakage.
      b. Air Lines – 5 percent of starting test pressure.
      c. Other lines – As specified elsewhere or directed by the Engineer.

3.5 WATER TESTS FOR SANITARY MANHOLES, TANKS AND DRAINAGE BASINS

A. Structures may be water tested simultaneously with non-pressure pipes. If the allowable leakage is exceeded, separately test each structure and each run of pipe in the failed section.

B. Structures may be tested prior to or after backfilling by filling them with clean water to the top. Conduct test for 6 hours.

C. Engineer reserves the right to require an infiltration test if he is not satisfied with exfiltration test.

D. Test structures and wet wells prior to filling interior joints and prior to constructing the manhole inverts and benches, but after all pipe connections to the manholes have been made.

E. Allowable exfiltration leakage is one gallon/day/vertical foot.

3.6 VACUUM TESTS FOR SANITARY MANHOLES AND DRAINAGE BASINS

A. Manholes may be vacuum tested in lieu of the previously described water test. The vacuum tests must be accomplished prior to back-filling the manhole, filling joints, and constructing the manhole inverts and benches. All pipe connections shall be made prior to the test.

B. Test Procedure

1. Plug pipe openings and securely brace the plugs and pipe.
2. Set the tester onto the top section of the manhole and inflate the compression band to effect a seal between the structure and the vacuum base.
3. Connect the vacuum pump to the outlet port, open the valve, start the motor and draw a vacuum of 10” Hg (Mercury).
4. Close the value and monitor the vacuum gauge.
5. The test shall pass if the vacuum holds at 10” Hg or drops no lower than 9” Hg within the following times:

Depth of Manhole	Time
0’-10’	25 sec.
10’-15’	40 sec.
15’-20’	55 sec.
20’-25’	70 sec.

6. If the vacuum drops in excess of the prescribed rate, the contractor shall locate the leak, make proper repairs, and retest the manhole
7. If the unit fails the test after repair, the unit shall be water exfiltration tested.

3.7 ALLOWABLE LEAKAGE

A. It is the intent of this Contract to secure piping systems with leakage, in each section of pipe and within each structure, equal to, or less than that specified. It is also the intent to secure a piping system free from visible drips, streams, and leaks. Therefore, even if a portion of the system meets the requirements for allowable leakage, visible leaks are not permitted and shall be stopped.

B. Leakage tests will be considered satisfactorily passed when the rate of leakage is equal to or less than the stipulated allowances, there is no evidence of visible leaks, and there is no evidence of other system defects.

3.8 RETESTING

A. Pipes and manholes not passing the tests shall be all defects corrected to the satisfaction of Engineer, and shall be retested and re-corrected as often as is necessary until the test requirements have been met.

B. It is the intent of this Contract to obtain work meeting test requirements on their own and solely through the use of the normal integral sealing components. Joint leaks shall not be stopped through the use of concrete, caulking, mortar, or other patching materials. Leaking pipe joints shall be rejoined and leaking manhole joints shall have joints reset, or replaced if necessary.

C. Methods other than rejoining, resetting or replacing joint seal shall require the written approval of Engineer.

D. Structures not passing the tests shall have defects corrected to the satisfaction of Engineer, and shall be retested and re-corrected as often as is necessary until the test requirements have been met.

LEAKAGE REQUIREMENTS

STRUCTURE MAT'L	DURATION (2)	ALLOWABLE LEAKAGE (1)
CONCRETE		
Exposed	2 Days	0.10%
Epoxy Coated	2 Days	None
STEEL	24 Hours	None
PLASTIC/FRP	24 Hours	None
RUBBER/PLASTIC LINED	7 Days	0.01%

1. Percentage of total test volume.
2. Times shown are consecutive times.

VISIBLE DRIPS, LEAKS, STREAMS OR RUNNING WATER IS NOT PERMITTED.

3.9 DISINFECTION (WATER LINES)

A. The completed pipeline is to be disinfected in accordance with AWWA C651, Continuous Feed Method. Prior to disinfecting the Water Main, the Main shall be completely filled to remove all air pockets and then flushed to remove particulates. The flushing velocity in the Main shall not be less than 2.5 feet per second unless the Engineer or OWNER's Authorized Representative determines that conditions do not permit the required flow to be discharged from the existing distribution system. Note that flushing is no substitute of preventative measures during construction.

B. The complete pipeline is to be disinfected with a chlorine concentration of approximately fifty parts per million (50 ppm) prior to being placed in service. The introduction of this chlorine shall be accomplished by pumping hypochlorite(calcium or sodium based) solution into the Main at a point not more than ten (10)feet downstream from the beginning of the new Main while flow water in the manner similar to initial filling.

C. The chlorinated water is to remain in the new pipeline for at least twenty-four (24)hours. After a twenty -four (24) hour holding period, there should be a free chlorine concentration of not less than ten milligrams per liter (10 mg/L). During this period, proper precautions are to be taken to prevent this chlorinated water from flowing back into the existing system. In addition, all valves and hydrants in the treated section shall be operated to ensure disinfection of the appurtenances.

D. FLUSHING AND BACTERIOLOGICAL ANALYSES

1. After all disinfection and testing is completed, the CONTRACTOR will be required to flush the new Water Mains under the direction of the Engineer. Flushing of the Main is to be accomplished at as high a velocity as possible consistent with the ability of the existing system to supply water and the ability of the area around the blow-off point to drain the water off. After clean water substantially free of chlorine is obtained at the blow-off, the flow of water at reduced rates is to be continued for at least one hour.
2. After the twenty-four (24) hour disinfection period and all chlorine solution has been thoroughly flushed from the Mains, the CONTRACTOR shall have total coliform bacteria analyses conducted on samples from each hydrant conducted by a State Department of Environmental Protection certified Commercial Laboratory. If anyone sample contains detectable coliform bacteria, then the disinfection process and testing process shall be repeated until all samples are free of coliform bacteria.
3. After satisfactory completion of the flushing and bacteriological testing, the new main is to be placed in service. However, the main is to be checked occasionally to determine if any build-up of chlorine or taste occurs. If any build-up does occur, then additional slow rate flushing for a period sufficient to clear the pipeline shall be repeated.

END OF SECTION 01666

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Documentation for Completed Work.

B. Final Clean-up.

1.02 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, the General Conditions, Supplementary Conditions and all Sections in Division 1 of these specifications.

1.03 MEASUREMENT AND PAYMENT

A. No separate Measure or Payment will be made for work in this Section. All costs in connection therewith shall be considered incidental to the Contract Bid Price.

1.04 SUBSTANTIAL COMPLETION

A. PROCEDURE

1. Completion must take place within thirty (30) business days of the signing of the Contract. Completion includes the “punch list” work described in the following paragraphs.
2. Prior to requesting final inspection and project close-out the CONTRACTOR shall assure that the work is completed in accordance with the specified requirements and is ready for the requested inspection.
3. Within a reasonable period of time after receipt of the request, the Engineer will inspect the work to review compliance, completeness, and issue a listing of unsatisfactory work. The CONTRACTOR will remedy the deficiencies and the work will be re-inspected.

1.05 FINAL COMPLETION AND PROJECT CLOSE-OUT DOCUMENTS

A. The Close-out Submittals include but are not necessarily limited to:

1. Evidence of payment and release of liens.
2. Written guarantee, as specified.

1.06 FINAL CLEANING

A. Where material or debris has washed or flowed or has been placed in existing watercourses, ditches, drains, pipe, or structures, for work done under the Contract work limits or elsewhere during the courses of the CONTRACTOR’s operations, such material or debris shall be entirely removed and satisfactorily disposed during the progress of the Work, and the ditches, channels, drains, pipes, structures, and work, etc. shall, upon completion of the Work, be left in a clean and neat condition.

B. The CONTRACTOR shall restore or replace, when as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the CONTRACTOR shall do as required all necessary highway or driveway, walk and

landscaping work. Suitable materials, equipment and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable, as work progresses, and shall not be left until the end of the Contract period.

1.07 COMPLETION

A. The Contract shall be considered complete and final payment made only when:
   1. All provisions of the Contract Documents have been strictly adhered to.
   2. The project and premises have been left in good order, including removal of all temporary construction, CONTRACTOR-owned and extraneous materials, as required.

END OF SECTION

Division 2

Site Work

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. This Section includes the following:
   1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
   2. Excavating and backfilling for buildings and structures.
   3. Drainage course for slabs-on-grade.
   4. Subbase course for concrete walks, pavements.
   5. Subbase and base course for asphalt paving.
   6. Subsurface drainage backfill for walls and trenches.
   7. Excavating and backfilling for utility trenches.
   8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
   9. Supply and installation of separation geotextile fabrics for subdrainage.
   10. Supply and installation of subdrain pipework.

1.03 RELATED DOCUMENTS

A. The following items of related work are specified and included in the other Sections of the Specifications:
   1. Section 02270 EROSION AND SEDIMENTATION CONTROL
   2. Section 02500 PAVING, CURBING AND SIDEWALKS
   3. Section 02607 PRECAST CONCRETE STRUCTURES
   4. Section 02616 BURIED PIPE & FITTINGS
   5. Section 02900 LOAMING AND SEEDING
   6. Section 03300 CAST IN PLACE CONCRETE
   7. Section 10301 RECTANGULAR RAPID FLASHING BEACONS

1.04 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 Engineer.
   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 Architect. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footing, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. 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.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.05 SUBMITTALS

A. Product Data: For the following:
1. Each type of plastic warning tape.
2. Geotextile.
3. Controlled low-strength material, including design mixture.
4. Geofoam.

B. Samples: 12-by-12-inch Sample of subdrainage geotextile.

C. 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 on-site and borrow soil material proposed for fill and backfill.

D. Pre-excavation Photographs or 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.

E. Contractor to submit dewatering plan fourteen (14) days prior to excavation.

F. Method Statements: From Contractor stating intended procedure for related earthwork and site issues. Submit before earthwork begins.
1. Traffic Safety and Control
2. Temporary Fencing
3. Noise & Security
4. Bulk Excavation
5. Handling & Disposal
6. Dewatering (including disposal)
7. Contingency Measures (to be implemented where set action trigger levels require)
8. Quality control & Management System to be employed (including working with and allowing access for any instrumentation and monitoring)

1.06 QUALITY ASSURANCE

A. Pre-excavation Photographs or 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.

1.07 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
   1. Notify Engineer not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Engineer'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.

C. Prior to submitting his proposal, the contractor shall review and understand the information contained in the Drawings and Geotechnical Investigation Report. The contractor must draw his own conclusions regarding site conditions based up on site visit(s) and from available sources. The Contractor shall assume that subsurface conditions between subsurface explorations could differ from conditions shown in the records of exploration.

PART 2 – PRODUCTS

2.01 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient 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. 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.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with a maximum stone size of 3 inches in the largest dimension, per MDOT Specification M1.03.0, Type B, EXCEPT not more than 7 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with a maximum stone size of 2 inches in the largest dimension per MDOT Specification M1.03.0, Type C, EXCEPT not more than 7 percent passing a No. 200 sieve,

F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel; crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1 1/2 – inch sieve EXCEPT not more than 8 percent passing a No. 200 sieve.

H. Structural Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand that is classified under AASHTO-M145 as A3, or that portion of A-1 with less than 12% passing the No. 200 sieve as determined by AASHTO-T11 and T27.

I. Processed Gravel for Subbase: Subbase material of crusher-run gravel, meeting the specifications of MHD M1.03.1.

Sieve Size	Percent Passing by Weight	
	Minimum	Maximum
3-inch	100	
1 1/2-inch	70	100

3/4-inch	50	85
No. 4	30	60
No. 200	0	10

This material is suitable for use as 'Controlled Fill'.

J. Crushed Stone Course: The free-draining material shall be processed crushed stone and shall be clean, inert, hard durable stone and coarse sand free from Loam or clay, surface coatings, and deleterious materials. It shall also be double washed and free from ice and snow, roots, sod, rubbish, or organic matter, and shall meet the requirements for MDOT Item M2.01.4, in Standard Specifications for Highways and Bridges, latest edition. The gradation requirements are as follows:

Sieve Size	Percent Passing by Weight	
	Minimum	Maximum
1-inch	100	
3/4-inch	90	100
1/2-inch	10	50
3/8-inch	0	20
No. 4	0	5

K. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel; crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

L. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passive a No. 8 sieve.

M. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate graded Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

N. Sand Bedding: ASTM C 33; fine aggregate, natural, or manufactured sand as per MDOT Specification M1.04.0, Type A – Max. particle size ¼".

O. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

N. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand as per MDOT Specification M1.04.0, Type A – Max. particle size ¼".

P. Pea stone: Pea stone material, where indicated on the plans, shall be an intermediate size between a finer filter/topsoil course material, and a coarser drainage/gravel course, for the purpose of preventing the migration of a fine material into the coarser material. An acceptable gradation shall be calculated based on selected gradations of the filter course and reservoir course using criteria outlined in the HEC 11 (Brown and Clyde, 1989). A pea-gravel with a median particle diameter of 3/8" is commonplace.

Q. Dense Graded Crushed Stone for Subbase: Subbase material combining crusher-run coarse aggregates of crushed stone (Trap only, meeting MM2.01.0,1) and fine aggregates of natural sand or stone screenings uniformly premixed with a predetermined quantity of water; MDOT M2.01.7.

Sieve Size	Percent Passing by Weight	
	Minimum	Maximum
2-inch	100	
1 1/2-inch	70	100
3/4-inch	50	85
No. 4	30	55
No. 50	8	24
No. 200	3	7

R. Bioretention Soil shall conform to the following specifications: 20-30% planting/topsoil, 30-40% compost and 40% sand.
   1. The topsoil shall have a maximum particle diameter of 2 inches, maximum clay/silt content of 5% (<5% passing #200 sieve), have a minimum of 15% organic content, and be free of stones and noxious weeds.

S. Crushed Granite Stone Screening: 3/8" minus native broken stone screening material, Williams Stone Company Decomposed Granite, where indicated on the plans. Refer to 'Stabilizer Solutions' manufacturers documentation for mixing and installation procedures.

2.02 GEOTEXTILES

A. Subsurface Drainage Geotextile: New, 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. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
   3. Permittivity: 0.5 per second, minimum; ASTM D 4491.
   4. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: 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. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4355.

C. Supplier Quality Control: The supplier shall perform quality control tests of geotextile, at a minimum of once for every 5000 square yards to evaluate material's conformance to published material properties. The supplier shall reject rolls for which quality control requirements are not met.

D. During shipment, the geotextile shall be protected from ultraviolet light exposure, precipitation, mud, dirt, dust, puncture, or other damaging or deleterious conditions. Upon delivery at the job site, the contractor shall ensure that the geotextile rolls are handled and stored in accordance with the manufacturer's instructions as to prevent damage.

2.03 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Low-density, self-compacting, flowable concrete material as follows:
   1. Portland Cement: ASTM C 150, Type I or II.
   2. Fly Ash: ASTM C 618, Class C or F.
   3. Normal-Weight Aggregate: ASTM C 33, ¾-inch nominal maximum aggregate size.
   4. Water: ASTM C 94/C 94M.
   5. Air-Entraining Admixture: ASTM C 260.

B. Produce conventional-weight, controlled low-strength material with 140-psi compressive strength when tested according to ASTM C 495.

2.04 GEOFOAM

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, 1.80 lb/cu. ft..

B. Molded-Polystyrene Board Insulation: ASTM C 578, Type II, 1.35 lb/cu. ft..
   1. Manufacture molded polystyrene with an inorganic mineral registered with the EPA and suitable for application as a termite deterrent.

C. Geofoam Connectors: Deformed steel reinforcing bars, ¾ inch in diameter.

2.05 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape with metallic tracing wire or a traceable metallic warning tape manufactured for marking and identifying underground

utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; 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 system.

2.06 SUBDRAIN PIPES

A. Site Subdrain pipes shall be 4” or 6” inner diameter, as specified, perforated Polyethylene pipe. The pipes shall be perforated with openings compatible with the grading of the surrounding Drainage Course (Section 2.1 above).

PART 3- EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section “Site Preparation”.

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section “Site Preparation,” and “Erosion and Sedimentation Control”, during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.02 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

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. Dewatering shall continue to maintain a dry excavation until the permanent works subdrainage system is in place and fully operational, mat foundation and basement walls are constructed, and backfill has been placed Obtain confirmation of schedule for installation and commissioning of permanent works subdrainage system.

3.03 EXPLOSIVES

A. Explosives: Do not use explosives.

3.04 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. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
   a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
4. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations 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.
5. Battering of temporary slopes for excavation is a temporary works issue and is the responsibility of the Contractor. The Excavation Contractor shall coordinate the excavation work with the main Contractor.
6. Design of temporary slopes shall be submitted to the Engineer for comment/information/record a minimum of 2 weeks prior to commencement of work.

3.05 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.

3.06 EXCAVATION FOR WALKS AND IMPERVIOUS PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.07 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 for water lines or force mains 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 conduit and non-plastic pipe. Plastic pipe trenches shall be uniformly over excavated per details to place pipe bedding below the pipe. Shape subgrade or pipe bedding to provide

continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp edges 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 or pipe bedding and support pipe and conduit on undisturbed subgrade or bedding material.
2. For pipes and conduits 6 inches or larger in nominal diameter, shape bottom of trench or pipe bedding to support bottom 90 degrees of pipe circumference. Fill depressions with tamped pipe bedding backfill.
3. Excavate trenches 9 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.08 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. 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 a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.09 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. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavation under other construction or utility pipe as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavation satisfactory soil material without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust and saturation from precipitation.

1. Stockpile soil materials away from edge of excavations. Do not store with drip line of remaining trees.

B. Stockpile topsoil as a separate stockpile removed from other excavated soils. Piles shall not exceed 6 feet in height.

3.11 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. Surveying location of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL (NOT ELECTRICAL UTILITIES)

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 specified in Structural Cast-in-Place Concrete Specifications

D. Provide 4-inch thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.

E. 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.

F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

G. Place and compact final backfill of satisfactory soil to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 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 follows:
   1. Under grass and planted areas, use satisfactory soil material as specified by the Landscape Architect.
   2. Under walks and pavements, use satisfactory soil material.
   3. Under steps and ramps, use engineered fill.
   4. Under building slabs, use engineered fill.
   5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 GEOFOAM FILL

A. Place a leveling course of sand, 2 inches thick, over subgrade. Finish leveling course to a tolerance of ½ inch when tested with a 10-foot straightedge.
   1. Place leveling course on subgrades free of mud, frost, snow, or ice

B. Install geofoam blocks in layers with abutting edges and ends and with the long dimension of each block at right angles to blocks in each subsequent layer. Offset joints of blocks in successive layers.

C. Install geofoam connectors at each layer of geofoam to resist horizontal displacement according to geofoam manufacturer's written instructions.

D. Cover geofoam with subdrainage separation geotextile before placing overlying soil materials.

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 Modified Proctor.
   2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent Modified Proctor.
   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 84-86 percent Modified Proctor.
   4. For utility trenches, compact each layer of initial and initial backfill soil material at 92 percent Modified Proctor.

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. Rough Grading
   1. Rough grading shall include shaping, trimming, rolling and finishing of the sub-base, shoulders, and earth slopes, and the preparation of the subbase for all landscaped and paved areas. Up to 2 inches in 10 foot tolerance will be permitted on slopes and one inch in ten feet on landscape areas provided the slopes are uniform in appearance and without abrupt changes. All ruts shall be eliminated. Grading of subgrades for paved areas shall be furnished to the required depths and parallel to finish grade within 3/8-inch per 10'-0" tolerance.
   2. Grades shall be brought below finish grades in accordance with the depths listed below:

C. Subgrades shall be surveyed and correlated with the project's elevation datum at one foot contour intervals with an accuracy of +/- ½". Planting soils shall not be placed until elevations of subgrades have been approved by the Landscape Architect.

D. 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 inch.
   3. Pavements: Plus or minus ½ inch.

E. Grading inside Building Lines: finish subgrade to a tolerance of ½ inch when tested with a 10-foot straightedge.

3.18 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: specified in Part 2 - Products.

B. Subsurface Drain: Place a 6" layer of Sand/Gravel Mix in bottom of trench. Place a 4-inch course of Drainage Course material on Sand/Gravel Mix to support subdrainage pipe, leaving a

4 to 6” gap, both sides, between edges of material and trench walls. Place Subdrainage Pipe. Encase subdrainage pipe with a minimum of 6 inches of Drainage Course material around pipe perimeter, again leaving a 4 to 6 inch gap, both sides, between Drainage Course material and trench walls.

1. Compact each Drainage Course material and Sand/ Gravel mix layer to 85 percent of maximum dry unit weight according to ASTM D 1557 with a minimum of two passes of a plate-type vibratory compactor.

C. Drainage Backfill: Place and compact Sand/Gravel Mix material over inner core of Drainage Course immediately surrounding the 4” pipe and the bottom layer of Sand/Gravel Mix, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick.

1. Compact each Drainage Course and Sand/ Gravel mix material layer to 85 percent of maximum dry unit weight according to ASTM D 1557 with a minimum of two passes of a plate-type vibratory compactor.

D. The final cross-section through the completed subdrain assembly shall consist of a fabric sock encased, 4” perforated pipe immediately surrounded by an inner core of Drainage Course material, having a minimum thickness of 4 inches as measured radially from the pipes’ wall, followed by an unbroken envelope, with a minimum thickness of 6” measures radially from the pipes’ wall, of Sand/Gravel Mix backfill.

E. Refer to Planting Soils Underdrainage for planting subdrains and for coordination of planting underdrains with site subdrainage and drainage system.

3.19 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 side 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.

C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders as shown on the plans and of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.20 BASEMENT FLOOR SUBGRADE

A. Refer to structural specifications and geotechnical recommendations for fill placement and compaction beneath building floors.

3.21 DRAINAGE COURSE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer’s written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.22 FIELD QUALITY CONTROL

A. Testing Agency: A qualified independent geotechnical engineering testing agency shall be retained, as specified in the Project Documents, 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 Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1557, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Test will be performed at the following locations and frequencies:
   1. Paved and Building 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. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
   3. 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 that 2 tests
   4. Subgrade under Lawn and Planting Areas: At each compacted backfill layer and on native unfilled subgrade, 1test for each 500 square feet.

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.

3.23 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 Engineer; 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.

3.24 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: transport surplus satisfactory soil to designated storage areas on Owner’s property. Stockpile or spread soil as directed by Engineer.
   1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner’s property.

3.25 GEOTEXTILE FABRIC

A. The geotextile shall be handled and laid in accordance with the supplier’s and manufacturer’s recommendations, standards, and guidelines. The fabric shall be ballasted or pinned temporarily without excessive wrinkling but with due allowance for sagging and to ensure excessive tensile forces are not generated during subsequent fill placement.

B. Cut geotextile using approved cutter only. Do not entrap in geotextile excessive dust, stones, or moisture that could damage or clog drains or filters.

C. The geotextile shall be handled in such a manner as to ensure that it is not damaged in any way. Should the Contractor damage the geotextile to the extent it is no longer usable as determined by the specifications or by the Engineer, the Contractor shall replace the geotextile at his own cost.

D. The installer shall not use heavy equipment to traffic above the geotextile without an approved protection layer.

E. The geotextile shall be covered as soon as possible after installation and approval. Installed geotextile shall not be left exposed to sunlight for more than 2 days.

F. Material overlying the geotextile shall be carefully placed to avoid wrinkling or damage to the geotextile.

G. The geotextile overlap between adjacent strips shall be a minimum of 12 inches.

H. Repairs: Repair holes or tears in a geotextile with a patch from the same geotextile material, seamed in place with a minimum seam overlap of 12 inches in all directions. Remove any soil or other material that may have penetrated the torn geotextile.

I. Geotextile should extend horizontally a minimum of 3 feet beyond exterior of mat foundation and should extend vertically to the ground surface outside of the basement walls.

3.26 SUBDRAIN PIPES

A. Lay pipes and ensure pipes are completely surrounded by granular layer.

B. Pipes shall be joined using methods recommended by the supplier.

3.27 BACKFILL ADJACENT TO EXTERIOR BASEMENT WALLS

A. The Crushed Stone Course, unless otherwise specified by the Structural Engineer, should be used as backfill adjacent to the basement walls within a minimum of 1 feet of the outer edge of the slab. Beyond this 1-foot distance, Structural Fill shall be used to backfill the remainder of the excavation.

B. Compaction: The Structural Fill and Underslab Drainage Course should be compacted to a minimum of 95 percent of the Maximum Dry Density when tested in accordance with AASHTO T180, Method D (Modified Proctor).

C. Placement of Structural Fill should not exceed a maximum loose lift thickness of 6 to 9 inches. The loose lift thickness should be reduced in conjunction with the compacted equipment used so that the required density is attained.

D. Do not use frozen material or materials containing ice. Do not place fill on frozen surfaces.

E. Geotextile shall be used placed in such a manner to separate the Crushed Stone Course and the Structural Fill to prevent migration of fines.

F. The following minimum laboratory and field quality assurance testing frequencies are to be undertaken on the Structural Fill to confirm fill material quality and post placement and compaction conditions. These minimum frequencies are based on generally uniform material properties and placement conditions. Should material properties vary or conditions at the time of placement vary (i.e. moisture content, placement and compaction, procedures or equipment, etc.) then additional testing may be required by the Engineer.
   1. Moisture Content (AASHTO T310) – 1 test per 200 cubic yards.
   2. Grain Size Analysis (AASHTO T11 and T27) – 1 test per 200 cubic yards
   3. Modified Proctor Moisture Density Relationship (AASHTO T180, Method D) – 1 test per 1000 cubic yards.
   4. Field In-Place Moisture/Density Testing (AASHTO T310, Method B) In situ density – 1 test per 1600 square feet.

END OF SECTION

SECTION 02270

SEDIMENTATION AND EROSION CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The CONTRACTOR shall perform surface protection and erosion control work as shown on the Plans and specified herein. The major portions of the work include:

1. Place and maintain catch basin silt sacks where shown on the Plans or required by the site conditions.
2. Erosion control of all areas disturbed during construction activities.

B. The Measures specified herein are the minimum requirements with which the CONTRACTOR shall comply to control erosion and siltation. The CONTRACTOR shall provide additional work if necessary to control erosion and siltation throughout the duration of the construction.

1.02 RELATED SECTIONS

A. Documents affecting the Work of this Section include but are not necessarily limited to the General Conditions, Supplementary Conditions, and all Sections in Division 1 of these Specifications.

B. Section 02200 - Earthwork

1.03 MEASUREMENT AND PAYMENT

A. No separate measurement and payment will be made for work in this Section. All costs in connection therewith shall be considered incidental to the Lump Sum Bid Price.

1.04 SUBMITTALS

A. Submit to the Engineer, as provided in, Material Specification and Shop Drawings for all materials and equipment furnished under this Section.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Silt sack installed in catch basin inlets of the type normally used for siltation or erosion control on construction projects.

PART 3 - EXECUTION

3.01 SILT SACK

A. The CONTRACTOR shall be responsible for control of erosion and situation during the construction. This shall require silt sacks in catch basin inlets.

B. Silt sacks shall be placed as detailed on the Drawings The removal of the silt sacks shall be done once finished pavement is in place, or vegetation adjacent to the basin has been established or at the discretion of the Engineer.

END OF SECTION

SECTION 02500

PAVING, CURBING & SIDEWALKS

PART 1 - GENERAL

1.01 REFERENCES

A. The GENERAL DOCUMENTS, as listed on the Table of Contents, and applicable parts of Division 1, GENERAL REQUIREMENTS, shall be included in and made part of this Section.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 SCOPE

A. The work of this Section consists of all concrete pavement work and related items as indicated on the Drawings and/or as specified herein and includes, but is not necessarily limited to, the following:
   1. Bituminous concrete roadway
   2. Concrete sidewalk
   3. Granite curbing

1.03 RELATED WORK UNDER OTHER SECTIONS

A. The following items of related work are specified and included in the other Sections of the Specifications:
   1. Section 02200 Earthworks
   2. Section 02860 Reflectorized pavement markings
   3. Section 03300 Cast-in-Place Concrete

1.04 DEFINITIONS

A. The following related items are included herein and shall mean:
   1. Standard MDPW Specifications: The Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges, latest revisions.
   2. ASTM: American Society for Testing and Materials.
   3. AASHTO: American Association of State Highway and Transportation Officials.

1.05 SAMPLES AND SUBMITTALS

A. At least thirty (30) days prior to intended use, the Contractor shall provide the following samples and/or submittals for approval in conformance with requirements of Section 01300, SUBMITTALS. Do not order materials until the Owner's approval of samples, certifications or test results have been obtained. Delivered materials shall closely match the approved samples.
   1. Design Mix: Submit a design mix for all bituminous concrete approval prior to ordering materials for the project.
   2. Concrete design mix for all concrete pavements.
   3. Samples – Submit product literature for the following items:
      a. Joint filler, removable plastic joint cap, primer and sealant for expansion joints.
      b. Concrete curing compound.
   4. Granite Curb
      a. Samples: Granite Curb, Type VA-4: Submit a sample to verify compliance with Specification requirements.
      b. Shop Drawings: Granite Curb, Type VA-4: Submit completed shop drawings, schedule for quantity, length and size of curbing.
      c. Design Mix: Submit concrete design mix for concrete cradle at granite curb.

PART 2- PRODUCTS

2.01 BITUMINOUS CONCRETE PAVEMENT

A. At least thirty (30) days prior to intended use, the contractor shall provide the following samples and/or submittals for approval in conformance with requirements for roadway shall be Class I, Type I-1, furnished in accordance with Section M3, Paragraph 3.11.03 of the Standard Specifications, except as modified herein.

The master range composition tolerance for bituminous concrete materials shall be as follows:

TABLE A (As Modified)

Percent by Weight Passing Square Opening Sieves

Standard Sieves	Base Course	Binder Course	Top Course	Dense Mix
2”	100	---	---	---
1”	55-80	100	---	---
¾”	---	80-100	---	---
5/8”	---	---	100	---
½”	40-65	55-75	95-100	100
3/8”	---	---	80-100	80-100
No. 4	20-45	28-50	50-76	55-80
No. 8	15-33	---	37-54	48-63
No. 16	---	---	26-40	36-49
No. 30	8-17	8-22	17-29	24-38
No. 50	4-12	5-15	10-21	14-27
No. 100	---	---	5-16	6-18
No. 200	0-4	0-5	2-7	4-8
Bitumen	4-5	4.5-5.5	5.5-7.0	7-8

*For dense mix the maximum aggregate size allowable shall be 3/8”.

1. Bituminous concrete for roadway shall consist of two (2) courses of bituminous concrete with a minimum finished pavement depth after rolling of four and a half inches (4 ½”).
   a. The first course shall be three inches (3”) in thickness consisting of one lift of Base Course bituminous concrete as shown above.
   b. The top course shall be one and a half inches (1 ½”) in thickness consisting of one course of Top Course bituminous concrete as shown above.

B. Base materials shall be specified under Section 02200, Earthwork. Depths shall be as shown on the Drawings.

2.02 TACK COAT

A. Tack coat shall consist of asphalt emulsion, Type RS-1 as described in the Standard Specifications under M3.03.0 and M3.11.06.

2.03 GRANITE CURB

A. Curb shall be new granite curb of hard durable stone conforming to the requirements of Type VA-4 curb, Section M9, Paragraph 9.04.1 of the MDPW Standard Specifications for curb except as amended herein. All curbs shall have sawed tops finish and shall be provided from a single quarry source.

B. Concrete cradle shall conform to the requirements and applicable provisions of Section M4 of the Standard Specification. Minimum 28 day compressive strength for concrete shall be 4,500 psi.

C. Gravel fill shall be as specified under Section 02200.

2.04 CALCIUM CHLORIDE

A. CALCIUM CHLORIDE – shall meet the requirements of AASHTO M-144 and shall be spread wherever directed to control dust conditions. The Engineer may direct the CONTRACTOR to employ sprinkling of water in lieu of calcium chloride for dust control.

2.05 CONCRETE PAVEMENT (SIDEWALKS)

A. See Section 03300 Cast-in-Place Concrete.

PART 3 - EXECUTION

3.01 BITUMINOUS CONCRETE

A. Make any corrections necessary to base material furnished and placed under Section 02200, EARTHWORK, to bring base course materials to sections and elevations shown on the Drawings where applicable.

B. Place binder and top course bituminous concrete patches and leveling and overlay courses in conformance to application and depth requirements shown on the Drawings and specified herein. All depths referenced shall be compacted thickness. Bituminous concrete for binder course and top course shall be furnished and laid in accordance with Section 460 of the MHD Standard Specifications, and as directed herein and by the details.

C. The Engineer may require the Contractor to remove and replace at his own expense any defective mix not conforming to the specified job mix formula.

D. After the bituminous base has hardened, a tack coat of bituminous material as specified shall be uniformly applied by mechanical means to the base surface at the rate of 0.05 gallons per square yard immediately prior to laying the top course of new pavement. If new pavement has become soiled and dirty or for an overlay on milled pavement, prior to installing additional courses above it, it shall be thoroughly cleaned and have tack coat applied immediately prior to placing the additional course(s).

E. If, at any time before the final acceptance of the work, any soft, imperfect places or spots shall develop in the surface, as such places shall be removed and placed with new materials and then compacted until the edges at which the new work connects with the old become invisible.

F. Bituminous Concrete Placement: General Requirements.

1. The mixtures shall be placed and compacted only at such times as to permit the proper inspection and checking by the Owner's Representative.
2. The mixtures shall be placed only upon approved surfaces that are clean and dry; and when weather conditions are suitable. No bituminous material shall be applied when the temperature is below 32 degrees F.
3. The temperature of bituminous concrete mixture when delivered to the site shall conform to the following, with a tolerance of plus or minus 20 degrees F.

Air Temperature	Projected Delivery Temperatures
35° F	300° F
40° F	290° F
65° F	280° F
90° F, or over	275° F

4. The contact surfaces of curbing, manholes, catch basins or other appurtenant structures in pavement shall be painted thoroughly with a thin uniform coating of tack coat just before any bituminous mixture is placed against them.

G. Machine Spreading

1. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to lines, grade, with and crown by means of fully automated controls for both longitudinal and transverse slope.
2. All mixtures shall be deposited in an approved mechanical spreader and immediately spread thereby, and then struck off in a uniform layer to the full width required and of such

depth that each course, when compacted, shall have the required thickness and shall conform to the grade and cross section contour specified.

H. Hand Spreading
   1. Spreading by hand methods will be permitted only for particular locations in the work with because of irregularity, inaccessibility or other unavoidable obstacles that do not allow mechanical spreading and finishing.

I. Compaction
   1. After the paving mixture has been properly spread, compaction shall be obtained by the use of power rollers of approved design and weight per inch of roller. The roller shall be steel wheeled supplemented with pneumatic-tired rollers where required.
   2. Along curbs, structures and all places not accessible with a roller, the mixture shall be thoroughly compacted with mechanical tamping devices. The surface of the mixture after compaction shall be smooth and true to the established line and grade.
   3. The densities of the completed pavement shall be not less than 95% of the density obtained from laboratory compaction of a mixture composed of the same materials in like proportions.

J. All areas of finished paving on which water stands or which are found excessively uneven shall be promptly brought to the correct grade and line. When tested with a ten foot (10') straightedge there shall be no deviation from true surface planes represented by the grade elevations shown on the drawings in excessive of one-quarter inch (1/4").

K. Do any repair or patching to pavements outside the project site damaged by work of the contract. All patching work required shall be in accordance with requirements for new construction.

L. No vehicular traffic of any kind shall be allowed to pass over the newly finished surface until it has had time to set. Two (2) hours will be considered sufficient time for the pavement to set in most cases, but this period may be reduced or extended by the Owner's Representative as required by weather or other reasons.

3.02 CEMENT CONCRETE SIDEWALK REPAIR

A. Remove damaged portion of sidewalk by saw cutting at the joints adjacent to the damaged area.

B. Replace sidewalk in accordance with Section 700 of the Massachusetts Department of Public Works "Standard Specifications for Highway and Bridges". Sidewalk to be six (6) inches thick.

C. Place a one-half (1/2) inch thick pre-molded expansion joint filler the entire width of the walk at each new joint.

3.03 BITUMINOUS CONCRETE CURB

A. Bituminous Concrete curb shall consist of machine formed bituminous concrete to the dimensions and details shown on the Drawings.

B. Immediately prior to laying the curb, the underlying bituminous pavement surface shall be cleaned of all foreign or objectionable matter with power blower, power brooms or hand brooms. The portion of the surface prepared for immediate treatment shall be dry and in a satisfactory condition. Immediately following the preparation of the surface, the bituminous material for tack coat as specified herein shall be applied either by means of a pressure distributor or by hand methods.

C. Upon arrival at the site, the mixture shall be transferred from the truck to the hopper of an automatic curbing machine and the mixture shall be kept clean and free from dirt or foreign materials at all times. The automatic curbing machine shall be the self-propelled type, equipped with a hopper, distributing screw and an interchangeable forming mold which can be raised or lowered and shall be capable of shaping hot bituminous mixtures to the cross-section, as shown on the plans without tearing, shoving or gouging. It shall provide a finished surface of uniform evenness. The machine shall be either wheel – or skid – mounted and shall be capable of

forming curb to the radius of forty-seven feet (47'). Size, weight, and speed shall be synchronized so as to produce a smooth, even distribution of mixture. The machine shall be propelled entirely by the pressure resulting from the asphaltic mixture being forced into the mold by the worm feed.

D. Asphalt mixtures that have a temperature of less than 225 degrees F when dumped into the hopper will be rejected. The mold or compaction chamber of the curb machine shall be so adjusted as to be not greater than on-quarter inch (1/4") above the surface of the underlying pavement. The mechanical curb machine shall be adjusted and the speed regulated in order to obtain the maximum degree of compaction and density and to insure that the surface will be smooth and in conformance to the cross-section, line, and grade as shown on the Drawings. Placing of the mixture shall be as nearly continuous as possible. The surface of the curbing shall be tested with a ten foot (10') straightedge and any variations from a true line exceeding one-quarter inch (1/4") shall be satisfactorily corrected.

E. After the completion of curbing, traffic shall be kept at a safe distance for a period of not less than twenty-four (24) hours and until the curbing has set sufficiently to prevent injury to the work.

F. If at any time before acceptance of the work, any soft or imperfect spots develop in the exposed surface of the curb, such material shall be removed and replaced with new curb, without additional compensation to the Contractor.

3.04 CONCRETE PAVEMENT (SIDEWALKS)

A. Make any corrections necessary to granular fill furnished and installed under Section 02200, EARTHWORK, to bring base material to the sections and elevations shown on the Drawings.

B. Concrete pavement placement, curing, testing, reinforcing and protection and form work shall be as specified in Section 901 of the Standard Specifications and as directed herein. Concrete shall have a medium broom finish and scored according to the detail Drawings.

C. All forms shall be joined neatly and tightly, shall be set hue to line and grade, well staked and braced, and shall have uniform bearing throughout their length.

D. Wire mesh used for reinforcement shall be rolled flat before placing concrete. Mesh reinforcement shall be held firmly in place against vertical or transverse movement by means of satisfactory devices. Where mesh reinforcement is spliced, it shall be lapped at least twelve inches (12"). Unless designated otherwise on the Drawings, wire mesh shall be placed midway within the depth, and parallel to the finished surface of concrete pavements.

E. Concrete shall be placed in one (1) course, to full depth, as detailed on the drawings.

F. No concrete shall be deposited until the Engineer has inspected the placing of reinforcement and given permission to place concrete.

G. Expansion joints shall be placed where pavement meets curbing or structures, including light bases, hydrants and at other conditions as shown on the Drawings.
   1. Place expansion joints twenty feet (20') on center and/or as indicated on the Drawings. Follow the manufacturer's application recommendations for joint filler and sealer. Expansion joints shall be on-half inch (1/2") wide. Joint alignment shall be straight and true.
   2. Clean joint surfaces immediately before application of primer and installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which interfere with bond of sealant. Do not proceed unless all joint surfaces are completely dry. Use primer for joints as recommended by sealant manufacturer.

H. Install expansion dowels and sleeves perpendicular to and across all expansion joints in the concrete paving at two feet (2') on center minimum, or as shown on the Drawings.
   1. Forms shall not be moved for 72 hours after the concrete has been placed, or for a longer period if directed by the Engineer. Extreme care shall be taken in removing forms in order that no damage will be done to the concrete. Under no condition shall any bar, pick or other tool be used which depends upon leverage on the concrete for removal of the forms.

3.05 CONCRETE TOOLING AND FINISHING

A. Concrete pavement shall be scored in a grid pattern as shown on the Drawings and tooled at expansion joint edges with one-quarter inch (1/4”) radius edging tool.

B. Following edging, concrete pavement shall receive a medium broom finish applied in a direction perpendicular to the flow of traffic.

3.06 CONCRETE PAVEMENT CURING AND PROTECTION

A. Curing of the finished concrete surface shall be started as soon as it is possible to do so without damaging the surface. the surface shall be wetted or otherwise kept moist throughout a minimum six (6) day curing period through the use of polyethylene film, wetted burlap, or by a spray applied curing compound. The concrete surface shall be protected from all traffic or other disturbance during the curing period.

B. The Contractor shall provide adequate surveillance for all poured-in-place concrete pavements until concrete has set firmly, to prevent unwarranted markings of the concrete surface. Any unauthorized marking or graffiti in the finished surfaces shall be a cause for rejection by the Owner and replacement by the Contractor.

C. Adequate protection shall be provided where temperatures of forty degrees (40° F) or lower occur during placing of concrete, and during the early curing period. The minimum temperature of fresh concrete after placing, and for the first three (3) days shall be maintained above fifty-five degrees (55° F). In addition to the above requirements, an additional three (3) days of protection from freezing shall be maintained.

3.07 GRANITE CURB

A. The trench for the curb shall be executed to a width of eighteen inches (18”) and a minimum depth below finished grade of twelve inches (12”) plus the depth of the curb.

B. Place gravel fill base in accordance with requirements of Section 02200.

C. Install curb on concrete cradle in accordance with details shown on the Drawings. All spaces under the curb shall be filled with dry placed, zero slump, Class D concrete so that the curb will be completely supported throughout its length. After proper alignment of curbing and concrete base has been established, place additional concrete, of slightly wetter consistency, to extend concrete up each face of curbing, as detailed on the Drawings.

D. Curb alignment shall be uniform, with smooth and continuous lines. Radius curbs shall meet with a common tangent.

E. Curb shall be fitted together as closely as possible. Joints between curb stones shall be carefully filled with cement mortar and have a tooled finish neatly pointed on the top and exposed faces.

END OF SECTION

SECTION 02583

RECTANGULAR RAPID FLASHING BEACONS (SOLAR)

PART 1 - GENERAL

All work under this item shall be in accordance with Section 800 of the Standard Specifications, the Plans, and the following:

1.01 DESCRIPTION

A. The work shall include furnishing and installing a solar-powered, pedestrian actuated, rectangular rapid flashing beacon (RRFB) system at the locations shown in the plans. RRFBs are intended to provide supplemental warning to approaching vehicles of the potential for pedestrians to be crossing in an adjacent crosswalk.

PART 2 - PRODUCTS

2.01 MATERIALS

A. An RRFB system shall, at a minimum, consist of the following items, which shall be included in the lump sum bid:

- (2) concrete foundations;
- (2) 15’ traffic signal posts and pedestals;
- (2) APS pushbutton systems;
- (4) dual rectangular yellow LED beacons in NEMA enclosures;
- (2) 9”x12” R10-25 (PUSH BUTTON TO TURN ON WARNING LIGHTS) signs;
- (4) 30”x30” W11-2 (Pedestrian Warning) signs;
- (2) 24”x12” W16-7PR and (2) 24”x12” W16-7PL (Diagonal Downward Arrow) signs;
- (2) solar panels;
- (2) NEMA Type 3R or higher enclosures to house:
  - Electrical components, including wiring and solid-state circuit boards;
  - On-board user interface;
  - Battery; and
  - Frequency hopping spread spectrum (or other alternate FCC approved) wireless activation unit with a minimum 150’ range; and
- All mounting and supporting hardware and wiring necessary to complete a working system.

RRFB controller and LED beacons, APS pushbutton systems, and traffic signal posts and pedestals shall be listed on the Qualified Traffic Control Equipment List. Pedestals shall be cast iron.

B. The light intensity of the LED beacons during daytime conditions shall meet the minimum specifications for Class 1 yellow peak luminous intensity in the Society of Automotive Engineers (SAE) Standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January, 2005. An automatic signal dimming device shall be included to reduce the brilliance of the LED beacons during nighttime conditions.

C. All signs shall be MUTCD-compliant. R10-25 signs shall have a black border and legend on a white background. W11-2, W16-7PR, and W16-7PL signs shall have a black border and legend on a fluorescent yellow-green background. All sign sheeting materials shall be per Subsection 828.41.

D. R10-25 signs may be integrated into the APS pushbutton system as a single unit or mounted separately on Type A aluminum.

E. W11-2, W16-7PR, and W16-7PL signs shall be Type A aluminum per Subsection 828.42.

F. Any proprietary software required for the programming and/or operation of the system shall be included at no additional cost.

G. The solar panels shall be affixed to an aluminum plate and bracket, adjustable at an angle of 45° to 60° and each assembly shall be mounted on a 360° rotatable pole cap mount to facilitate adjustment for maximum solar collection and optimal battery strength. The solar panel assemblies shall be rated for 90 mph wind conditions.

H. The batteries shall conform to Battery Council International specifications and have a capacity allowing up to 30 days of autonomy without sunlight and varying with ambient temperature and number of activations. The batteries shall be rated for a minimum lifespan of 3 years. Batteries shall be replaceable independently of other components.

I. The solar panels and battery shall have a minimum operating temperature range of -40° to 122°F (-40° to 50°C).

J. The Contractor shall provide shop drawings and calculations to confirm solar panel sizing and battery/solar energy storage will meet the functional requirements of the system.

2.02 FUNCTIONAL REQUIREMENTS

A. The RRFB system shall remain dark until pedestrian actuation.

B. Upon actuation, all LED beacons shall activate and flash in a rapidly flashing sequence. Each sequence shall last 800 milliseconds and there shall be 75 sequences per minute. The sequence shall be the same for each pair of LED beacons in an enclosure and shall be as follows:

1. The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds.
2. Both RRFB indications shall be dark for approximately 50 milliseconds.
3. The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds.
4. Both RRFB indications shall be dark for approximately 50 milliseconds.
5. The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds.
6. Both RRFB indications shall be dark for approximately 50 milliseconds.
7. The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds.
8. Both RRFB indications shall be dark for approximately 50 milliseconds.
9. Both RRFB indications shall be illuminated for approximately 50 milliseconds.
10. Both RRFB indications shall be dark for approximately 50 milliseconds.
11. Both RRFB indications shall be illuminated for approximately 50 milliseconds.
12. Both RRFB indications shall be dark for approximately 250 milliseconds.

C. The flash rate of each individual RRFB indication, as applied over the full flashing sequence, shall not be between 5 and 30 flashes per second.

D. All RRFBs within the system shall commence and cease operation simultaneously.

E. The length of the flashing cycle upon actuation and the minimum allowable time between actuations shall be per the plans. These settings shall be user-programmable through the on-board user interface. No-fee wireless (Wi-Fi, Bluetooth®, etc.) may be used as an alternative programming method.

G. Each APS pushbutton shall have a tactile arrow and locator tone. The tactile arrow shall be oriented to point in the direction of the crosswalk. The locator tone shall have a duration of 0.15 seconds or less and shall repeat at 1-second intervals. The locator tone shall be set 2 to 5 dBA above ambient sound, shall automatically adjust intensity, but cap at a maximum volume of 100 dBA. The tone shall be audible whenever the LED modules are not active.

G. Upon activation of the LED modules, a speech message shall state, “Yellow lights are flashing.” This message shall be stated twice. No vibrotactile or percussive indications shall be used.

H. If a pushbutton is pressed before the minimum time between actuation intervals is met, a speech message shall state, “Wait,” and the locator tone shall resume until the LED modules activate.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. No work shall commence until the shop drawings are approved.

B. Layout and design of the RRFB system shall conform to the plans.

C. Foundation installations shall be per Subsection 801.62. The top of the foundation shall be ¼” to 1” proud of the sidewalk and chamfered at 45 degrees. Gaps between the sidewalk and foundation shall be no larger than ¼” and grouted with preformed joint filler.

D. The Contractor shall diagnose and replace any part of the pedestrian activated warning system that is found to be defective in workmanship, material, or manner of functioning within six months of final acceptance by the Engineer. This requirement does not supersede the one-year warranty period on materials specified in Subsection 815.20.

END OF SECTION

SECTION 02607

PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Modular precast concrete catch basin sections for storm drainage systems with lipped male/female joints, with masonry to lid frame, grate, anchorage and accessories.

1.3 RELATED WORK

A. Section 02200 EARTH MOVING

B. Section 02616 BURIED PIPE & FITTINGS

1.4 REFERENCES

A. ANSI/ASTM C66 - Concrete Building Brick.

B. ASTM A48 - Gray Iron Castings.

C. ASTM C478 - Precast Reinforced Concrete Manhole Sections.

D. ASTM C923 - Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.

1.5 SUBMITTALS

A. Shop Drawings: Indicate catch basin locations, elevations, piping, sizes and elevations of penetrations.

B. Product Data: Provide manhole covers, component construction, features, configuration, dimensions.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 50 degrees F. (10 degrees C.) prior to, during and 48 hours after completion of masonry work

PART 2 - PRODUCTS

2.1 MATERIALS

A. Catch Basins shall be reinforced, precast concrete in accordance with ASTM C478; gaskets in accordance with ASTM C923.

B. Drain manhole and other drainage control structures shall be reinforced, precast concrete in accordance with ASTM C478; gaskets in accordance with ASTM C923.

2.2 COMPONENTS

A. Lid and Frame: Ductile or Cast iron construction, machine flat bearing surface removable lid, sizes shall be 24”x24” for catch basins, 30” diameter (ductile iron preferred) for manholes, or as shown on the Drawings. Lids and frames shall be capable of H20 loading and be by East Jordan Iron Works, Saint Gobain, Neenah, LeBaron, or Deeter foundry or equal. Drain and Sewer manhole covers shall be marked accordingly. Catch basin frames shall have 3 flanges when abutting curbing. Frames shall also be reduced to 4” depth where necessary due to shallow pipe depths.

B. Drain Manhole Steps: Aluminum or steel reinforced polypropylene plastic rungs.

C. Base Section: Precast concrete with lipped male/female joints.

2.3 CONFIGURATION

A. Shaft construction: Barrel section shall be concentric and shall have eccentric cone top section for sewer manholes and eccentric flat or cone top sections for drain manholes and catch basins; with cast in place sleeved to receive pipe sections for drain manholes.

B. Shape: Cylindrical.

C. Clear inside dimensions: Unless otherwise noted, forty-eight inch (48”) diameter for drain manholes and catch basins.

D. Design Depth: As indicated.

E. Clear lid opening: Unless otherwise noted, twenty-eight inches (28”) diameter minimum for manholes, twenty-two inches (22”) square, minimum for catch basins.

F. Pipe Entry: Profile openings, as shown on the plans. Grout all pipes in openings.

G. Steps: Twelve inches (12”) wide minimum, twelve inches (12”) on center vertically, are into manhole wall.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify items provided by other sections of work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into work.

C. Verify excavation for manholes is correct.

D. Verify clearance from other utilities, structures and obstructions.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections and sub-contractors.

3.3 PLACING PRECAST SECTIONS

A. Place base section, and level surface.

B. Place manhole sections plumb and level, trim to correct elevations.

C. For drain manholes grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour as detailed.

D. Set cast iron frames and covers so as to be flush with the top pavement course or grassed area.

E. Coordinate with other sections of work to provide correct size, shape and location.

3.4 MASONRY CONSTRUCTION

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Lay masonry units in running bond.

C. Form flush mortar joints.

D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

E. As work progresses, build in fabricated metal items.

F. Set cover frames and covers flush to correct elevations.

G. Grout base of shaft sections to achieve slope to exit pipe. Trowel smooth. Contour, as detailed.

H. Coordinate with other sections of work to provide correct size.

END OF SECTION

SECTION 02616

BURIED PIPE AND FITTINGS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Furnish all labor, materials, equipment and incidentals required to install pipe, fittings, and connections, as shown on the Plans and as specified herein.

B. Furnish all labor, materials, equipment and incidentals required to install any extra fittings, specials, shorts that are not shown on the Plans or as specified herein, but are required as a result of unexpected subsurface conditions or utility locations.

C. Unload, haul and distribute pipe, fittings, valves and all accessories.

D. Preparation of the construction site, including tree clearing, bush and debris, as well as removal and resetting of signs, mail boxes, guard rails, shrubs, leveling the construction path and any and all other site preparation work.

E. Excavation, including pavement, earth, rock, including surface water and drainage control, all sheeting, sheathing, shoring required to properly support trench sides and adjacent structures. All work site rules and regulations must be adhered to.

F. Protection of the Project, including appropriate barricades, watchmen, warning signs and lights, bridges, traffic control and all other related work, or that deemed necessary during the course of the project.

G. Lay and test all pipe, castings, fittings, valves and accessories.

H. Backfill, compaction and disposal of surplus materials.

I. Clean-up of Work area and maintenance of trench surfaces and adjacent areas.

1.3 RELATED WORK

A. Section 01666 PIPE & STRUCTURE LEAKAGE TESTING

B. Section 02200 EARTH MOVING

1.4 REFERENCES

A. All pipe and fittings shall conform to the latest edition of the following Specifications unless otherwise specified herein.

1. ANSI Standard Specification A21.51 (AWWA-C151) for Ductile Iron Pipe, Centrifugal Cast Metal Molds or Sand Lined Molds for Water and Other Liquids.
2. ANSI Standard Specification A21.50 (AWWA -C-150) for the Thickness Design of Ductile Iron Pipe.
3. ANSI Standard Specification A21.53 (AWWA-C-153) for Compact Design, 350 psi rating, Ductile Iron Fittings for Water.
4. ANSI Standard Specification A21.11 (AWWA-C-111) for Rubber-Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings.
5. ANSI Standard Specification A21.15 (AWWA-C-115) for Flanged Ductile-Iron Pipe with Threaded Flanges.
6. ANSI Standard Specification 21.4 (C104) Cement Mortar Lining for Ductile-Iron Pipe and Fittings.

B. American Water Works Association, AWWA C600, AWWA Standard for Installation of Ductile Iron Water Mains and their Appurtenances.

C. American Water Works Association, AWWA C651, AWWA Standard for Disinfecting Water Mains.

D. Cast Iron Soil Pipe – Inspect and test CISP in accordance with ASTM A74.

E. Copper Pipe – Inspect and test CUP in accordance with ASTM B88.

F. Polyethylene Pipe – Inspect and test PE Pipe in accordance with ATMS D1248.

G. Polyvinyl Chloride Pipe – Test as follows:

Test	In Accordance with
Quick Burst	ASTM D1599
Sustained Pressure	ASTM D1598
Acetone Immersion	ASTM D2152

H. Additional Testing – In addition to the test required above, Owner may perform additional testing on pipe delivered to the Project site.

1.5 SUBMITTALS

A. Submit to the Engineer, as provided in Submittals Section - Material Specifications and Shop Drawings for all materials and equipment furnished under this Section.

B. Provide Certificates of Compliance on Pipe Materials.

1.6 QUALITY ASSURANCE

A. The CONTRACTOR shall use test pits to fully investigate and determine the line and grade obstructions for utility services.

B. The CONTRACTOR shall secure all permits and pay all fees required to carry out the piping work. He shall comply with all laws, ordinances, codes, rules, and regulations of the local and state authorities having jurisdiction over any of the Work specified herein. Where provisions of the Contract are in conflict with the Codes, the Code shall govern requirements set forth in this Section and indicated on the Drawings. The Contract Documents shall govern when in excess of the required or minimum Regulations.

C. Prior to the first shipment of pipe, submit certified test reports that the pipe for this CONTRACT was manufactured and tested in accordance with the ASTM and ANSI/AWWA Standard Specifications.

D. All like pipe shall be from a single manufacturer. All fittings shall be from a single manufacturer, not necessarily the pipe manufacturer.

E. Inspection of the pipe and fittings will also be made by the Engineer after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job site at no additional cost to the OWNER.

F. All pipe, valves and accessories shall be laid, jointed and tested under pressure for defects and leakage in the manner hereinafter specified. All construction operations of the water line are to be carried out in the presence of, and subject to the approval of both the Sprinkler Engineer and the Site Engineer.

1.7 SITE CONDITIONS

A. Locations shown for existing structures, pipes, facilities, wires, and other under- and above-ground devices are approximate only and based on available records, pipe locating surveys and field observations. The CONTRACTOR shall have no claim if any utility, structure or pipeline is not shown in its correct location or is actually in the ground and now shown on the plan.

B. The CONTRACTOR shall be responsible for notifying utility owners reasonably in advance of his work and shall request of the utility owner stake out or mark by other suitable means underground facilities and structures. The CONTRACTOR shall notify the Engineer, in writing, of any failure of the utility to do so and the Engineer and CONTRACTOR will jointly take action to determine location of utilities prior to commencement of excavation.

C. The CONTRACTOR shall make explorations and excavations, for the determination of the location of existing underground structures, pipes, and house connection services.

D. No valve or other control device on the existing water system shall be operated and no tap or cut-in to the existing system shall be made by the CONTRACTOR without the approval of the Engineer or an authorized representative of the OWNER.

1.8 MAINTENANCE

A. MAINTENANCE OF TRAFFIC AND CLOSING OF STREETS

1. The CONTRACTOR shall carry on work in a manner which will cause the least interruption to traffic. The CONTRACTOR shall not close off any street to through travel without the express approval of the OWNER, local Police Chief and the Engineer. Where traffic must cross over trenches, the CONTRACTOR shall provide bridges, at street intersections and at driveways, especially where traffic cannot be detoured and where the trench must be maintained open for a period of time.

B. MAINTENANCE RESPONSIBILITY

1. During the life of this Contract and for a period of one year following the final acceptance of the entire project, the CONTRACTOR shall be responsible for and maintain the tank all pipelines, materials and equipment installed and shall correct any defects which may appear in the project during this warranty period.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE

A. All Ductile-Iron Pipe and Fittings shall have a bituminous outside coating in accordance with ANSI/AWWA-C-141 and C110, respectively, and shall be Class 52, cement mortar lined and seal coated on the inside in accordance with ANSI A21.4 (AWWA C104). Pipe shall be manufactured by US Pipe, Griffin Pipe Products, Clow Corporation or approved equal.

B. Mechanical joint Ductile Iron Pipe and Fittings joints shall be utilized as shown on the Drawings unless otherwise noted, or approved by the Engineer and shall conform to ANSI/AWWA A21.11/C11 as applicable.

C. All fittings shall be American made ductile iron, compact design, 350 psi rating, with mechanical joints unless otherwise noted, and shall conform to AWWA Specification C153-84.

D. At the connections to the existing transmission mains, mechanical joint retainer glands shall be installed to supplement concrete thrust blocks. Retainer glands shall be specifically designed to fit standard mechanical joint bells with corrosion resistant, low-alloy T-head bolts conforming to ANSI/AWWA-C-111/A21.11 and ANSI/AWWA-C-153/A21.53 of latest revision. Retainer glands shall be manufactured of ductile iron conforming to ASTM A536-80 Grade 60-42-10. Set screws shall be of hardened ductile iron and require the same torque in all sizes. Steel set-screws are not permitted. The retainer glands shall have a minimum two hundred and fifty (250) psi pressure rating with a minimum safety factor of two to one (2:1). Glands shall be listed with Underwriters Laboratories and/or approved by Factory Mutual.

E. On all water pipe and fittings, the CONTRACTOR shall make provisions for the electrical continuity of the pipeline. This may be accomplished by inserting three (3) bronze wedges into the joint. Wedges shall be placed as close to three (3) o'clock, nine (9) o'clock, and (12) twelve o’clock position as possible.

F. Couplings and transitional couplings shall consist of a cast iron sleeve and shall have gaskets suitable for the pipe being jointed. The bolts and nuts shall be stainless steel, type 30 K, or an approved equal. Couplings shall be Romac style 501, Dresser style 153,Rockwell type 431, or approved equal.

G. Concrete for thrust blocks and concrete encasement shall be three thousand (3,000) psi compressive strength in twenty-eight (28) days.

2.2 PVC

A. STANDARDS - POLY VINYL CHLORIDE PLASTIC PIPE

Poly Vinyl Chloride plastic pipe and fittings shall conform to the following standards:

1. ASTM Standard Specification for Poly Vinyl Chloride (PVC) and Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe Schedules 40, 80, and 120 for water and force mains, Designation D 1785.
2. ASTM Standard Specification for Socket-Type Poly Vinyl Chloride (PVC) and Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80,Designation D 2466.
3. ASTM Standard Specification for Socket-Type Poly Vinyl Chloride (PVC) and Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80, Designation D 2466.

4. ASTM Standard Specification for filled Poly Vinyl Chloride (PVC) Sewer Pipe Fittings, Designation D 2467.
5. ASTM Standard Specification for filled Poly Vinyl Chloride (PVC) Sewer Pipe, Designation D 2836.
6. ASTM Standard Specification for Type PSO Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings, Designation D 3033.
7. Plastic Pipe: ANSI/ASTM D3034, Type PSM (Vinyl Chloride) (PVC) material; SDR35, bell and spigot push-on joints.

B. SIZES
1. Refer to plans for pipe sizing.

C. JOINTS
1. Push on gasketed or solvent weld capable of handling required test pressures.

D. PIPE ACCESSORIES
1. Fittings: Same materials as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, clean-outs, reducers, traps and other configurations required.

E. PIPE BEDDING
1. Sand borrow as specified in Section 02200 and as detailed on the drawings.

2.3 CAST IRON SOIL PIPE

A. Pipe and Fittings – ASTM A74, extra heavy.

B. Joints – Factory fabricated rubber compression-type connections with removable gaskets conforming to ASTM C564.

C. Pipe Bedding – Gravel Borrow as specified in Section 02200 and as detailed on the Drawings, except in special conditions, where otherwise specified.

2.4 COPPER PIPE

A. Tubing – ANSI H23.1.
1. Underground installations – Soft annealed, Type K.
2. Interior and above-ground installations – Hard drawn domestic Type L.

B. DWV Drainage Tube – ANSI H23.6.

C. Fittings
1. Wrought copper solder type – ANSI B16.22.
2. Cast bronze flared tube fittings – ANSI B16.26.
3. Cast bronze solder type – ANSI B16.23.

D. Joints
1. Soldered – Solid string or wire solder composed of 95-5 tin and antimony. Use noncorrosive flux.
2. Flared – Flare pipe ends using proper size flaring tool specially manufactured for the flaring of pipe ends.

E. Pipe Bedding – Sand bedding as specified in Section 02200 and as detailed on the Drawings, except in rock, or where otherwise specified by Engineer.

2.5 HIGH DENSITY POLYETHYLENE PIPE (HDPE)

A. Non Pressure Pipe
1. Pipe and Fittings – ASTM D1248.
2. Joints – Coupling band with soil tight gasket or thermal butt-fusion in accordance with the pipe manufacturer's recommendations.
3. Pipe Bedding – Gravel Borrow or Crushed Stone as specified in Section 312010 and detailed on the Drawings, except in projection conditions, rock, where otherwise specified by Engineer.
4. Culverts and Storm Drain Pipe
    a. Hancor-HiQ with smooth interior.
    b. ADS – N12 with smooth interior.

B. Pressure Pipe

1. Polyethylene pressure pipe shall be made from high density, extra high molecular weight compound equaling a PE 3408 designation and shall conform to ASTM-1248 and ASTM-3350; with a cell classification of 345434C. The pipe shall have a pressure rating of 160 PSI, which is equivalent to SDR 11. The pipe shall be fusion joined.

2.6 COUPLINGS/FLEXIBLE CONNECTIONS

A. Sleeve Type Coupling – Style 38 by Dresser Manufacturing Division, Dresser Industries, Inc., or approved equal.

PART 3 - EXECUTION

3.1 EXCAVATION AND PREPARATION OF PIPE TRENCH

A. All piping shall be installed true to alignment and rigidly supported thrust anchors shall be provided where required. If necessary, each length of pipe shall be cleaned out before installation.

B. Pipe shall be installed in accordance with these Specifications regarding excavation and backfilling, alignment and grade, trench preparation, pipe laying, anchorage, testing, protection and cleaning. All backfilling shall be in accordance with Section 02200.

C. All pipe for nipples, closures and similar purposes shall be cut on the job from full lengths using a power saw as recommended by the manufacturer. The use of cold chisels or squeeze type cutters for cutting is strictly prohibited.

D. GENERAL - The water main shall be laid and maintained to the required lines and grades with fittings, valves and hydrants at the required locations; spigots centered in bells; and all valves and hydrant stems plumb.

E. DEVIATIONS - Whenever obstructions not shown on the Plans are encountered during the progress of the Work and interfere to the extent that alteration of the Plan is required, the Engineer shall revise the Plans and order a deviation from the line and grade. At locations where obstructions such as culverts, ducts, wire and/or pipes are encountered, the Water Mains will be laid over or under such obstacles with a clearance of twelve (12) inches. The choice of over or under shall be based on that which provides for the closest bury depth to five (5) feet, but not less with a minimum of twelve (12) inches between pipes. The Engineer reserves the right to make such alterations as he deems necessary.

F. DEPTH - Excavation is to be to a sufficient depth to provide for a minimum cover over the pipe of five (5) feet, unless otherwise directed on the Plan or in specifications. Minimum cover over the top of the pipeline will be measured from the top of the pipe to the surface of the ground on the lower side of the trench.

G. EXCAVATION PRECAUTIONS -The CONTRACTOR shall proceed with caution in excavation and preparation of the trench so that the exact location of underground structures, both known and unknown can be determined. Any damage caused during the course of excavation will be repaired in a manner acceptable to the Engineer.

H. EXCAVATION TO GRADE - The trench shall be excavated to a depth required so as to provide uniform and continuous bearing and support for the pipe on solid and undisturbed ground at every point between bell holes. Final excavation shall be done using hand tools so as the finished sub-grade of the pipe is accurately prepared and undisturbed. Any part of the bottom of the trench excavated below the required sub-grade shall be corrected with approved materials and compaction. The engineer shall be notified prior to correction for approval.

I. EXCAVATION BELOW GRADE - Earth pads are to be placed in the bottom of the trench in at least two (2) locations to support the pipe above the trench bottom during the process of installing the pipe, aligning and centering the spigot of the newly laid pipe in the bell of the adjacent pipe. Additional earth is to be placed beside and beneath the bell of the pipe prior to making up the joint and tamped to provide adequate support. Sand or other granular native material approved by the Engineer is to be used for supporting pads and for backfill under the barrel of the pipe. Should native material be unsatisfactory for this use the suitable borrow material will be authorized and paid for in the Gravel Borrow Item of these Specifications.

J. EXCAVATION IN POOR SOIL - Should the bottom of the trench at sub-grade be found to be unstable or to contain ashes, cinders, refuse, vegetable or other organic matter, or large pieces of inorganic material which the Engineer determines should be removed, the CONTRACTOR shall excavate and remove such material to the width and depth so ordered. Before the pipe is laid, the sub-grade shall be made by backfilling with an approved material in six (6) inch compaction layers, tamping at the direction of the Engineer. Locations where such additional excavation and refilling with select materials is authorized, the CONTRACTOR shall receive payment for such additional work under the applicable excavation and gravel borrow items of the Specifications.

K. WIDTH – The trench width must be maintained to be as narrow as possible as the pipe's ability to support external loads is diminished as the width of the trench increases. The trench must be excavated as narrow as possible, within the guidelines of pipe laying. The portion of the trench one (1) foot from the top of the pipe to the bottom limit of excavation should not be wider than the pipe diameter, plus two (2) feet.

L. PIPE CLEARANCE - Ledge rock, boulders and large stones shall be removed to provide a clearance of at least six (6) inches below and twelve (12) inches on each side of all pipes, valves and fittings.

M. SUB-GRADE IN ROCK TRENCHES - Where excavation in performed in rock or boulders the sub-grade shall be made by backfilling with an approved material in six (6) inch compacted layers. The layers shall be thoroughly tamped and shall be uniform and provide continuous bearing and support for the pipe at every point between the bell joints. In locations where additional excavation and backfilling with select material is authorized the CONTRACTOR shall receive payment for such additional work as specified in the applicable excavation and gravel borrow items.

N. BRACED AND SHEETED TRENCHES - The CONTRACTOR shall provide such sheeting, bracing and support for the trench sides and ends as may be required by Federal, State and Local Laws, regulations and ordinances and as may be necessary to adequately protect life, adjacent property, structures or work under construction. The CONTRACTOR shall provide this sheeting and bracing, including the cost of installation and removal.

O. TRENCHING - The major portion of the excavation will be carried out by using machine methods, however, the final portion of excavation in the trench bottom is to be carried out using hand methods so as to prevent disturbance to the supporting sub-grade. In special locations where the use of machinery for excavation may result in damage to adjacent pipelines, utilities or structures, the CONTRACTOR will be required to use hand methods. This is especially applicable in the immediate vicinity of conduits, service pipes and other pipelines where the use of machinery could result in danger.

3.2 LAYING PIPELINE

A. HANDLING PIPE AND FITTINGS - Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before installing, and no piece shall be installed which is found to be defective. There shall be no chain or forklift scars in the lining. Any damage to the pipe linings or coatings will result in the pipe or fitting being rejected and removed from the job by the CONTRACTOR at no additional cost to the OWNER.

B. DEFECTIVE PIPE - If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the OWNER. All pipe and fittings shall be thoroughly cleaned before installing, shall be kept clean until they are used in the work, and when installed shall conform to the lines, grades and dimensions required.

C. WATER MAIN MATERIALS IN THE TRENCH - Proper implements, tools and facilities shall be provided and used by the CONTRACTOR for the safe and convenient performance of the Work, as deemed satisfactory by the Engineer. All pipe, fittings, valves and hydrants shall be carefully lowered into the trench piece by piece by equipment, in such a manner as to prevent damage to Water Main Materials and protective coatings and linings. Under no circumstances shall Water Main Materials be dropped or dumped.

D. CLEANING PIPE AND FITTINGS

1. All lumps, blister, and excess coal-tar coating shall be removed from the bell and spigot ends of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, free from oil and grease before pipe is laid.
2. On all pipe using a rubber-type joint, the bell of the pipe and the spigot of the adjacent pipe are to be wire-brushed and then brushed clean with a paint brush and cleaned of all rust and dirt in the trench. The bell of the pipe, the rubber and the spigot of the adjacent pipe are then to be lubricated with the joint lubricant furnished with the pipe. Lubricant shall remain clean at all times and free of dust and fine sand and is to be used in accordance with the Manufacturer's directions. The CONTRACTOR shall prevent the lubricated end from grounding into the soil during the jointing process.

E. LAYING PIPE
1. Every precaution is to be taken to prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe.
2. When laying a rubber-jointed, pipe, the spigot end shall be centered in the bell, the pipe forced home and the joint completely assembled. The pipe is then to be adjusted to correct line and grade and to be secured in place with approved backfill material, properly tamped under and around the pipeline.
3. When laying the pipeline, any fittings which do not allow a sufficient and uniform space for joints shall be removed and replaced with pipe or fittings of proper dimensions to ensure a satisfactory joint.
4. At all times when pipe laying is not in progress, the open ends of the pipe shall be securely closed by a watertight plug or other means which shall be submitted and approved by the Engineer. This shall apply during noon hour and overnight, as well as during any other such delays in pipe laying procedure.

F. CUTTING PIPE
1. All pipe furnished on the job will be furnished in full lengths. Cutting of pipe for inserting valves, fittings or closure pieces and cutting of pipes for nipple pieces shall be done by the CONTRACTOR in a professional, workmanlike manner without damage to pipe or its lining. The cutting shall be leave a smooth end at right angles to the axis of the pipe. Cutting of pipe shall be accomplished by a power driven abrasive wheel. On pipe using rubber push-on joints, no saw cutting will be allowed.

G. JOINT DEFLECTION
1. Wherever it is necessary to deflect pipe from a straight line, vertical or horizontal, in order to avoid obstructions or for permitted long-radius curves, the amount of deflection allowed shall not exceed that required for accomplishing a satisfactory joint, and is to be approved by the Engineer.
2. Prior to deflecting the pipeline, the spigot of the pipeline should be marked flush with the bell end to assure that the spigot is not withdrawn as a result of deflection.
3. The maximum deflection recommended by the Manufacturer when using any pipe system must be observed when deflecting a pipeline.
4. In general, all radius curves shown on the Project Plans or permitted at the time of construction are to be made using full pipe lengths. The use of short lengths and extra joints to make a smaller radius will not be allowed without prior written approval.

H. UNSUITABLE LAYING CONDITIONS
1. No pipe shall be laid in water, unsuitable trenches or during unsuitable weather conditions.

3.3 PUSH-ON JOINTS

A. Push-on joints shall be made in accordance with the manufacturer's instructions. The bell and spigot shall be thoroughly cleaned of dirt and tar blisters in the trench. The rubber gasket shall be inserted and gasket and spigot shall be lubricated with a lubricant approved by the pipe manufacturer. A clean rag shall be placed under the joint to protect the joint from dirt caused by unintentional grounding of the pipe during jointing. The plane end of the pipe to be laid shall then be aligned and inserted into the bell end of the pipe to which it is to be joined, pushing home with a jack or by other means approved by the Engineer. After joining the pipe, a metal feeler gauge shall be used to verify that the rubber gasket is correctly positioned. Two (2) bronze wedges per joint shall be inserted to provide electrical continuity or water lines only.

3.4 MECHANICAL JOINTS

A. Mechanical joints shall be made in accordance with Appendix A of ANSI/AWWA C111 and the manufacturer's instructions. Thoroughly clean before assembly. Bolts shall be tightened to the manufacturer's specified torque using a torque wrench. Under no conditions shall extension wrenches or an extended handle ratchet wrench be used to gain greater leverage. All fittings shall have mechanical joints with 'Megalug' style (wedge action) retainer glands or approved equal and shall be submitted for approval by Engineer.

3.5 FLANGED JOINTS

A. Flanged joints shall be American Standard, one hundred and twenty-five (125) psi or 200% of the normal working pressure of the line, whichever is greater, complying with ANSI/B16.1, as amended. The flanges shall be plain faced, flat and may be smooth or serrated.

B. Gaskets shall be shop cut for application.

3.6 FUSION JOINTS

A. High density polyethylene (HDPE) pipe and fittings shall be joined by the heat fusion process which produces homogenous, sealed, leak-tight joints.

3.7 VALVES AND FITTINGS

A. A Valve Box shall be provided for each buried valve operator. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed.

3.8 ANCHORAGE

A. GENERAL
   1. Unless otherwise specified, all anchorage or supports for the various fittings, specials, valves and hydrants that are to be installed under this Contract will be accomplished using poured-in-place concrete thrust blocks.
   2. Thrust blocks of machine mixed concrete having a twenty-eight (28) day compressive strength of three thousand (3,000) psi, shall be placed at all bends, tees, dead ends, tapping sleeves and similar locations. The thrust blocks shall be poured-in-place. The pipeline materials and fittings shall be protected from direct adherence of the concrete thrust block by being wrapped in plastic, roofing felt, or similar material. The thrust block shall not bear directly on the joint and shall not interfere with future adjustments or tightening of the joint. All thrust blocks shall bear against undisturbed soil at the side or end of the trench and this undisturbed surface shall be carefully cleaned off so as to be vertical. The thrust blocks shall have a minimum horizontal thickness of two (2) feet and shall have the minimum bearing surfaces measured perpendicular to the direction of the thrust, as indicated on the drawings.

B. METAL HARNESS (FRICTION CLAMPS)
   1. At certain locations as shown on the Plans, or as otherwise specified, especially at caps and plugs located at dead-ends and at elbows located above grade, the use of metal harnesses to prevent movement will be specified. Metal harnesses are to consist of adjustable tie-rods and clamps of adequate strength to prevent movement under a full load.
   2. The metal clamps and rods are to be fabricated as shown on the Engineer's approval of Shop Drawings and, after installation, are to be painted with an asphalt or bituminous paint to prevent corrosion.

3.9 BACKFILLING

A. GENERAL
   1. Unless otherwise specified on the Plans, all backfill materials is to be obtained from the material excavated under the provisions of Section 02200 of the Specifications.
   2. All rock excavated under the provisions of Section 02200 is to be disposed of off the construction site and no portion of this rock, regardless of its conditions, is to be used as backfill material in the trench.

3. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, or other material which, in the opinion of the Engineer, is unsuitable. However, from one (1) foot above the top of the pipe to the sub-grade of the pavement, material containing stones up to nine (9) inches in their greatest dimension may be used unless specified otherwise herein.

B. USE OF EXCAVATED MATERIAL FOR BACKFILL
   1. In general, use of material excavated under from the trench will be allowed. The CONTRACTOR will be required to use the best, most granular portions of the excavated material for backfilling purposes with the better material placed in the bottom of the trench and around the pipeline.
   2. Where excavated material is indicated or specified for backfill and there is insufficiency thereof due to a rejection of a part of the excavation as unsuitable for backfill, the CONTRACTOR will be instructed to furnish the required amount of sand, gravel, or other approved fill materials under the applicable borrow item of the Contract.
   3. When excavated material is indicated or specified for backfill and there is an insufficient amount of this material at a particular location on the job due to rejection of a portion thereof, and if there is an excess of excavated material available at other portions of the job, the CONTRACTOR will be required to use the excess excavation available from one portion of the job to make up the deficiency existing on other portions of the job. The cost of moving this excess material from one portion of the job to the other and placing it in the trench is to be considered incidental to the cost of the Work.

C. INITIAL BACKFILLING
   1. All trenches shall be backfilled by hand from the bottom of the trench to the centerline of the pipe with the most granular material available from the excavation. This initial backfill is to be placed in layers approximately three (3) inches and thoroughly tamped under the pipeline and compacted around the pipe. This initial backfilling shall be deposited in the trench for its full width on both sides of the pipe, fittings and appurtenances simultaneously. While this initial backfill is being carried out under and up to the midpoint of the pipeline, the CONTRACTOR shall have one person tamping in the trench for each person shoveling backfill into the trench.
   2. On pipelines where the joints are to be left exposed during testing, the initial backfill is to be carried out only on the central portion of each length of pipe. After the pipeline testing has been completed and the pipeline has been accepted, the above-described procedure is then to be carried out around the joints left exposed.

D. BACKFILLING OVER PIPE
   1. From the centerline of the pipe, fittings and appurtenances to a depth of one (1) foot above the top of the pipe, the trench shall be backfilled by hand or by approved mechanical methods.
   2. On pipelines that are to be tested with exposed joints, the backfill for a depth of one (1) foot above the top of the pipe is to be placed over the central portion of each pipe length and thoroughly compacted as an aid in keeping the pipe in position during the test.
   3. In general, the placing of fill for the first foot above the top of the pipe is to be carried out by hand means and the only time that mechanical backfilling of this portion of the trench will be approved is when the backfilling material is composed of sand and is entirely free of stone and other hard or solid lumps. If the backfilling material is satisfactory for use with mechanical backfilling methods, the CONTRACTOR will be required to put backfill into the trench from one end of the excavation so that the backfill material will have a tendency to roll down the slopes of backfill already placed and will not fall with its full weight on the pipeline.

E. BACKFILLING TO GRADE
   1. From a point one (1) foot above the pipe to the road (except for State Highways), sidewalk or lawn sub-grade or to the finished grade, as applicable, the trench may be backfilled by approved mechanical methods. No heavy stone or rock shall be dropped into the trench, nor large masses of backfilling materials be dropped in the trench, nor large masses of backfilling materials be dropped in the trench in such a manner as to endanger the pipe. No piece of rock more than twelve (12) inches in maximum dimension shall be placed in the trench and if larger stones than these are found in the material to be used for

backfilling, they shall be broken up before placing in the trench or hauled away from the site of the Work. Care is to be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material.

2. Unless otherwise specified or directed by the Engineer, all excavations are to be compacted for the full depth of the trench using approved mechanical tampers. Backfill is to be placed in six (6) inch layers and each layer is to be thorough tamped. If required, the backfill material shall be sprinkled with water before tamping so as to improve compaction.

F. COMPACTION UNDER PERMANENT PAVEMENT (EXCEPT STATE HIGHWAYS)

1. Where excavation is made through permanent curbs, paved driveways or paved sidewalks, or where such structures are undercut by the excavation, the entire backfill to sub-grade of the structures is to be made with granular materials. These areas are to be compacted for the full depth of the trench using approved mechanical tampers. Backfill is to be placed in six (6) inch layers and each layer is to be thoroughly tamped. If required, the backfill material shall be sprinkled with water before tamping so as to improve compaction.

G. COMPACTION UNDER STATE HIGHWAY PAVEMENT

1. All backfill within the trench and under the State Highway paved surfaces shall be a controlled density fill as specified in Section 02200. The backfill shall extend from the bottom of the trench up to the bottom of the pavement. The fill in the excavation shall be protected from traffic by plating over the trench for a twenty-four (24) hour minimum at which time the permanent pavement can be installed.

H. BACKFILLING IN FREEZING WEATHER

1. Backfilling shall not be done in freezing weather except by written permission of the Engineer and it shall not be made with frozen material. No backfill shall be placed in a trench where the material exposed in the trench sides or bottoms is already frozen.

I. FIELD QUALITY CONTROL

1. All pipe shall be tested as specified in section 01666. Any deficiencies shall be made good at the expense of the contractor.

END OF SECTION

SECTION 02860

REFLECTORIZED PAVEMENT MARKINGS

PART 1 - DESCRIPTION

1.01 GENERAL

A. This item of work consists of furnishing materials and the application of Reflectorized Pavement Markings in accordance with the Commonwealth of Massachusetts, Department of Public Works, Manual on Uniform Traffic Control Devices, current edition.

PART 2 - MATERIALS

2.01 GENERAL

A. Materials shall be as specified under the particular payment item being used and shall meet the appropriate requirements specified in the following MDPW Subsections of Division III, Materials:

General Requirements for Paints and Protective Coatings	M7.00.00
White Thermoplastic Reflectorized Pavement Markings	M7.01.03
Yellow Thermoplastic Reflectorized Pavement Markings	M7.01.04
White Traffic Paint	M7.01.05
Yellow Traffic Paint	M7.01.06
Glass Beads	M7.01.07
White High Heat Rapid Drying Traffic Marking Material	M7.01.08
Yellow High Heat Rapid Drying Traffic Marking Material	M7.01.09
Striping Powder	M7.01.12
Preformed Permanent Plastic Pavement Markings or Legends	M7.01.18
Green Pavement Coatings	M7.01.21
Fast Drying White Water-Borne Traffic Paint	M7.01.23
Fast Drying Yellow Water-Borne Traffic Paint	M7.01.24

PART 3 - CONSTRUCTION METHODS

3.01 EQUIPMENT

A. All equipment used for the application of pavement markings shall be of standard commercial manufacture. All other equipment and devices necessary for the application of the pavement markings and protection thereof and for the protection to the traveling public shall be as usually required for work of the type and shall be furnished by the Contractor.

B. The pavement marking equipment shall be operated at the speed and in accordance with other requirements of the manufacturer, unless otherwise directed by the Engineer.

C. Truck mounted equipment is approved for the application of pavement markings except in such cases where in the Engineer’s judgment travel will be unreasonably delayed and/or the quality of the work performed by the machine is unsatisfactory.

3.02 LAYOUT OF WORK

A. A schedule of pavement marking operations shall be furnished by the Contractor for the approval of the Engineer prior to the application of any pavement markings. This schedule must be in the office of the Engineer 7 days prior to the proposed date of application of any pavement markings.

B. The Engineer will provide at a convenient location on the roadway a line of reference for use by the Contractor in establishing the location of markings. The line of reference shall be at a maximum of 50 foot intervals by means deemed satisfactory by the Engineer. All markings shall follow the line of reference without deviation. Any line deviation from the establishing control of incorrect width shall be reapplied, as directed by the Engineer in accordance with MDPW Subsection 860.62.

3.03 APPLICATION OF MARKINGS

Pavement markings shall be applied as follows:

Material	Material Application Temperature	Line Thickness	Reflectorized Bead Application
M7.01.05	115°F-125°F	15 mils	6 lbs/gal
M7.01.06	115°F-125°F	15 mils	6 lbs/gal
M7.01.08	180°F-195°F	15 mils	6 lbs /gal
M7.01.09	180°F-195°F	15 mils	6 lbs /gal
M7.01.10	40°F-120°F	15 mils	6 lbs/ gal
M7.01.11	40°F-120°F	15 mils	6 lbs/gal
M7.01.03	400°F-425°F	125-188 mils	1 #/10 SF Drop on
M7.01.04	400°F-425°F	125-188 mils	1 #/10 SF Drop on
M7.01.23	135°F-150°F	15 mils	6 lbs/gal
M7.01.24	135°F-150°F	15 mils	6 lbs/gal

Line thickness above the roadway surface shall meet the minimum requirements regardless of the type of surface on which it is applied.

A. No thinners shall be used for the above listed pavement marking applications except in accordance with the manufacturer's specifications and at the direction of the Engineer.

B. No paint or pavement marking material shall be heated above the temperature marked on the container.

C. Markings shall be applied only in seasonable weather and in accordance with good painting practices. The surface shall be dry and free of sand, grease, oil or other foreign substances prior to the application. The Contractor shall prepare the surface to accept the application as part of this item, with no additional compensation. The Engineer will make the final determination for all of the foregoing.

D. Bituminous concrete pavements shall have been in place for 48 hours prior to the application of pavement markings except preformed permanent plastic pavement markings which can be applied immediately. When it is necessary to expedite the flow of traffic, the Engineer may reduce the waiting period as is deemed necessary.

E. If for any reason material is spilled or tracked on the highway, or any markings applied by the Contractor, in the Engineer's judgment, fail to conform to Subsection 860.61, because of a deviation from the desired pattern, the Contractor shall remove such material by a method that is not injurious to the roadway surface and is acceptable to the Engineer, clean the roadway surface and prepare the surface for a reapplication of markings and reapply the markings as directed without additional compensation for any of the foregoing corrective operations.

F. The ambient (air) temperature for thermoplastic application is to be a minimum of 45°F and rising at the time of marking operations. If work has started and air temperatures fall below 45°F and continuous cooling is indicated, work shall be stopped. In cool weather conditions, temporary drops down to 40°F will be tolerated, providing temperatures also vary upwards. Sustained striping (greater than one hour) at 40° F shall not be allowed. Starting work at air temperatures lower than 45°F shall not be allowed.

3.04 PROTECTION OF MARKINGS

A. Markings shall remain protected until sufficiently dry to bear traffic on highways that are open to traffic. Markings shall be protected by traffic cones of not less then 28" in height except in the case of markings which cure to a no track condition in 180 seconds or less in the latter case protection may be provided by a convoy of vehicles with suitable warning devices to warn overtaking or on coming traffic that the pavement marking operation is in progress.

1. Broken Lines

a. On tangents and on curves of 1000 foot radius or greater at least 1 cone shall be placed on every other bar. On curves of less then 1000 foot radius 1 cone shall be placed on every bar unless otherwise directed by the Engineer.

2. Solid Lines

a. On tangents and on curves of 1000 foot radius or greater, cones shall be spaced not over 80 feet apart and on curves of less that 1000 feet radius the spacing shall be not over 50 feet unless otherwise directed by the Engineer. On edge line adjacent to the median wider spacing may be used at the direction of the Engineer. In order to control the proper positioning of the cones during the drying period, the Contractor shall assign sufficient personnel as determined by the Engineer. Such control is dependent on the traffic density, cone widths, etc.

3.05 ACCOMMODATION OF TRAFFIC

A. All warning signs and traffic control devices as required shall be in accordance with Section 01570 of these Specifications and MassDOT specifications.

B. No work shall be done on this item on roadways open to traffic on Saturdays, Sundays, the day before a holiday or on a holiday except when otherwise specifically directed by the Engineer.

C. Both lanes of two-lane highways shall remain open to traffic at all times. On multi-lane highways only one lane shall be closed to traffic at any time.

D. Work under this item may be suspended, at the discretion of the Engineer, during peak traffic hours or at any other time when, in his judgment, traffic is being unduly hampered or delayed by the work, under this item.

END OF SECTION

SECTION 02900

LOAMING AND SEEDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The repair of trees and lawn surfaces damaged during the course of construction activities.

B. New loam and seeded areas as required to repair from damages caused during construction or as determined by the Engineer.

1.02 RELATED SECTIONS

A. Section 02200 - Earthwork

1. 03 SUBMITTALS

A. The name and qualifications of any landscape subcontractor to perform the Work in this Section.

B. A schedule showing scheduled dates for all loaming and seeding Work.

C. A test report before delivery of off-site topsoil. Soil analysis shall be made by an independent testing laboratory approved by the Engineer and shall indicate porosity, pH, organic content, mineral content, and percentages of silt, clay and sand.

D. Manufacturer's Certificates of Compliance for each seed mixture proposed, stating botanical and common name, percentage by weight and percentage of purity, germination, and weed seed for each species.

E. Samples of all material for inspection and approval upon the Engineer's request.

1. 04 PROJECT/SITE CONDITIONS

A. Do not spread seed when wind velocity exceeds five (5) miles per hour.

B. Do not plant when drought, excessive moisture, or other unsatisfactory conditions prevail.

C. Loaming and seeding shall be performed during normal planting seasons.

PART 2 - PRODUCTS

2.01 MATERIALS

A. TOPSOIL

1. Topsoil shall be existing on-site, stripped and stockpiled material, or off-site fertile, friable, natural topsoil typical of topsoil of the locality. It shall be without admixture of subsoil or slag and free of stones, lumps, plants and their roots, sticks, clay, peat and other extraneous matter and shall not be delivered to the site or used while in a frozen or muddy condition.
2. Topsoil shall meet the following analysis:

a: Sieve Analysis

Sieve Size	Percentage Passing
3/4 inch	100%
No. 4 Sieve	90-100%
No. 200 Sieve	0-100%

b. Clay content of material passing No. 200 sieve not greater than sixty percent (60%), as determined by hydrometer tests.

c. pH 6.0 to pH7.

d. Organic content not less than five percent (5%), as determined by loss of ignition of moisture - free samples dried at one hundred (100) degrees Celsius.
e. Free of pests and pest larvae.

B. Lime shall be ground limestone containing not less than eight-five percent (85%) calcium and magnesium carbonates and be ground to such fineness that at least fifty percent (50%) shall pass a 100-mesh sieve and at least ninety percent (90%) shall pass a 20-mesh sieve.

C. Fertilizer shall be commercial mix free flowing granules or palletized fertilizer, 10-20-10 (N-P205-K20) grade for lawn and naturalized areas. Fertilizer shall be delivered to the site in original unopened containers each showing the manufacturer's guaranteed analysis, conforming to applicable state fertilizer laws. At least forty percent (40%) of the nitrogen in the fertilizer used shall be in slowly available (organic) form.

D. SEED
1. Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination, which date shall be within a period of six (6) months prior to commencement of planting operations. Seed shall be from the same or previous year's crop; each variety of seed shall have a purity of not less than eight-five percent (85%), a percentage of germination not less than ninety percent (90%), and a weed content of not more than one percent (1%) and contain no noxious weeds. The seed mixtures shall consist of seed proportioned by weight, as follows:

a. Lawn Area Seed Mix

Pennlawn Creeping Red Fescue	40%
Kentucky Bluegrass	40%
Palmer Perennial Ryegrass	10%

2. The seed shall be furnished and delivered pre-mixed in the proportions specified above. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

E. MULCH
1. Hay mulch shall be clean seed-free hay or straw.
2. Wood cellulose fiber for hydro seeding shall be a specially processed cellulose fiber containing no growth or germination inhibiting factors. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the materials shall allow absorption and percolation of moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content and not contain in excess of ten percent (10%) moisture.

PART 3 - EXECUTION

3.01 APPLICATION

A. Unless otherwise shown on the Drawings, topsoil shall be placed to a minimum compacted depth of four inches (4") on all parts of the site not covered with structures, pavement or sidewalk.

B. For all areas to be seeded:
1. Lime shall be applied at the rate of fifty (50) pounds per one thousand (1,000) square feet, or as determined by the soil analysis.
2. Fertilizer (10-20-10) shall be applied at the rate of thirty (30) pounds per one thousand (1,000) square feet, or as determined by the soil analysis.
3. Seed shall be sown at a rate recommended by the manufacturer.
4. Hay mulch shall be hand spread by shaking out the hay for a loose layer over the seeded area, or mechanically chopped and spread at a rate of fifty (50) pounds per one thousand (1,000) square feet.

5. Fiber mulch shall be applied at the rate of forty (40) pounds per one thousand (1,000) square feet.

C. After the topsoil is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over the loam surface and thoroughly incorporated by heavy raking to at least one-half (1/2) of the depth of the topsoil.

D. The application of fertilizer may be performed hydraulically in one (1) operation with hydro seeding and fiber mulching. The CONTRACTOR is responsible for cleaning all structures and paved areas of unwanted deposits of the hydro seeded mixture.

3.02 INSTALLATION

A. Obtain a good stand of grass, at least equal to the quality of lawn disturbed by the construction and the quality of lawn existing adjacent to the repairs, water and mow as necessary until the stand of grass is satisfactory.

B. Previously established grades, as shown on the Drawings, shall be maintained in

a true and even condition.

C. In carrying out his excavation, salvage all existing sod and loam. This salvage

material shall be machine-excavated and laid to one side.

D. On backfilling, the salvage shall be placed during the latter stage of backfilling so as to allow for the placement of at least four inches (4”) of fresh loam. The total depth of loam furnished on the Project shall be at least four inches (4”).

E. After topsoil has been spread, it shall be carefully prepared by scarifying or harrowing by hand raking. After stiff clods, lumps, roots, liters and other foreign material will be removed from the loamed area and disposed of by the CONTRACTOR. The area shall also be free of smaller stones in excessive quantities, as determined by the Engineer. The whole surface shall then be rolled with a hand roller weighing not more than one hundred (100) pounds per square foot of width, filling any settlements with additional loam for an even finished grade.

F. Schedules for seeding and fertilizing must be submitted to the Engineer for approval prior to the Work. Seeding as specified herein shall be performed between the period of April 1 to May 31 or August 15 to October 1. Seeding during the period from October 2 to March 31 shall only be undertaken upon approval of the Engineer. Seeding during the period from June 1 to August 14 shall only be performed if irrigation is provided.

G. When newly graded subgrade areas cannot be topsoiled and seeded because of season or weather conditions and will remain exposed for more than thirty (30) days, the

CONTRACTOR shall protect those areas against erosion and washouts by whatever means necessary such as straw applied with a tar tack, wood chips or by other measures as approved by the Engineer. Prior to application of topsoil, any such materials applied for erosion control shall be thoroughly incorporated into the subgrade by disking. Fertilizer shall be applied prior to spreading of topsoil.

H. On slopes, the CONTRACTOR shall provide against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the CONTRACTOR’s expense until a good sod is established.

3.03 MAINTAIN AND PROVISIONAL ACCEPTANCE

A. The responsibility for satisfactory results on work carried out under this Section rests entirely on the CONTRACTOR regardless of the prior approval of the materials and methods on the part of the Engineer.

B. Keep all seeded areas watered, lawn areas mowed and in good condition, reseeding all seeded areas if and when necessary until a good, healthy, uniform growth is established over the entire area and conditions are acceptable. Place suitable signs and barricades.

C. The Engineer will inspect all work for provisional acceptance at the end of a one (1) week period, upon the written request of the CONTRACTOR received at least two (2) days prior to the

anticipated date of inspection. The maintenance period must occur immediately following seeding prior to October 15 and shall include a minimum of one (1) mowing.

D. The inspection by the Engineer will determine whether maintenance shall continue in any area or manner. Maintenance shall include all regrading, refertilizing and reseeding which ay be necessary in the opinion of the Engineer.

E. After all necessary corrective work and clean-up has been completed, maintenance instructions have been received by the OWNER, and the OWNER has provisionally accepted the lawn areas, the CONTRACTOR's responsibility for maintenance of the lawns, or parts of the lawns ceases.

F. All seeded areas shall be guaranteed by the CONTRACTOR for not less than one (1) full year from the time of provisional acceptance.

G. Seeded areas that are not demonstrating satisfactory stands, as determined by the Engineer, shall be renovated, reseeded, and maintained meeting all requirements specified herein.

END OF SECTION

Division 3

Concrete

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 GENERAL

A. Submittals: Submit the follow evaluation reports for concrete materials and concrete mix designs.
   1. Written report to Engineer for each proposed concrete mix at least fifteen (15) days prior to start of concreting. Do not begin concrete production until mixes have been reviewed by the Engineer.

B. Quality Assurance: Comply with provisions of ACI 301, “Specifications for Structural Concrete for Buildings,” ACI 318, “Building Code Requirements for Reinforced Concrete,” and CRSI “Manual of Standard Practice,” except where more stringent requirements are indicated.
   1. Concrete Testing Service: The Owner will engage a testing agency to perform materials evaluation testing. The costs of testing and inspections will be the responsibility of the Contractor.

1.02 RELATED SECTIONS

A. Section 02500 – Paving, Curbing & Sidewalks

PART 2 - PRODUCTS

2.01 PRODUCTS

A. Form Materials: Furnish form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
   1. Forms for Exposed Concrete Surfaces: Suitable panel-type material to provide continuous, straight, smooth, exposed surfaces.

B. Reinforcing Materials: As follows:
   1. Deformed Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.
   2. Welded Wire Fabric: ASTM A 185.

C. Concrete Materials: As follows:
   1. Portland Cement: ASTM C 150, Type 1 or 2.
   2. Aggregates: ASTM C 33, size No. 7 for supported slabs.
   3. Water: Portable.

D. Admixtures: Provide admixtures that contain not more than 0.1 percent chloride ions.
   1. Air-Entraining Admixture: ASTM C 260.
   2. Water-Reducing, Retarding, and Accelerating Chemical Admixtures: ASTM C 494.

E. Related Materials: As follows:
   1. Waterstops: Bentonite strips.
   2. Vapor Retarder: Clear 8-mil-thick polyethylene.
   3. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
   4. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap, complying with ASTM C 171.
   5. Membrane-Forming Curing Compound: ASTM C 309, Type I. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

F. Mix Proportions and Design: Proportion mixes complying with mix design procedures specified in ACI 301.
   1. Design mixes, for exterior flatwork, to provide normal weight concrete with the following properties:
      a. 4500-psi, 28-day compressive strength; water-cement ratio, 0.58maximum (non-air-entrained), 0.46 maximum (air-entrained).

b. Refer to Division 2 specifications for concrete design mixes requiredfor other purposes/uses.

2. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
   a. Ramps, Slabs, and Sloping Surfaces: Not more than five inches (5”).
   b. Reinforced Foundation Systems: Not less than three inches (3”) and not more than five inches (5”).
   c. Other Concrete: Not more than five inches (5”).
3. Adjust mix designs when material characteristics, job conditions, weather, test results, or other circumstances warrant. Do not use revised concrete mixes until laboratory test data and strength results have been submitted to and reviewed by Engineer.

G. Use water-reducing, accelerating, and retarding admixtures that have been tested and accepted in mix designs in strict compliance with manufacturer’s directions.

H. Job-Site Mixing: Use drum-type batch machine mixer, mixing not less than one and one half (1-1/2) minutes for one (1) cu. yd. or smaller capacity. In crease mixing time at least fifteen (15) seconds for each additional. cu. yd.

I. Ready-Mix Concrete: ASTM C 94.

PART 3 - EXECUTION

A. Formwork: Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Select form materials to obtain required finishes.
   1. Maintain formwork tolerances and surface irregulanities within ACI 347 limits, Class A tolerances for concrete exposed to view and Class C tolerances for other concrete surfaces.
   2. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
   3. Clean and adjust forms prior to concrete placement. Apply form-release agents or wet forms as required. Retighten forms during concrete placement, if required, to eliminate mortar leaks.

B. Vapor Retarders/Barriers: Place vapor retarder/barrier membrane for slabs on grade, with joints lapped six inches (6”) and sealed.

C. Reinforcement: Accurately position and support reinforcement, and secure againstdisplacement. Locate and support reinforcement to maintain minimum cover with metal chairs, runners, bolsters, spacers, and hangers as required. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
   1. Install welded wire fabric in lengths as long as practicable; lap at least one full mesh and lace splices with wire.

D. Joints: Locate and install construction, isolation, and control joints as indicated or

required. Locate construction joints so they do not impair strength and appearance of structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and prevent random cracking.

E. Installation of Embedded Items: Set and build anchorage devices and other embedded items required for other work that is attached to or supported by cast-in place concrete. Use setting diagrams, templates, and instructions provided by others for locating and setting.
   1. Locate and support waterstops to prevent displacement.

F. Concrete Placement: comply with ACI 304, “Guide for Measuring, Mixing, Transporting, and Placing Concrete,” for placing concrete in a continuous operation within planned joints or sections. Do not begin concrete placement until other affected work is completed.
   1. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping so that concrete is worked around reinforcement and other embedded items and into forms.

2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.
    a. In cold weather comply with ACI 306.
    b. In hot weather comply with ACI 305.

G. Finish of Formed Surface: As follows:
1. Smooth-Formed Finish: Provide a smooth finish for concrete surfaces exposed to view and surfaces to be covered with a coating or covering material applied directly to concrete. Repair and patch defective areas, with fins and other projections completely removed and smoothed.

H. Monolithic Slab Finishes: As follows:
1. Nonslip Broom Finish: Apply nonslip broom finish to exterior concrete platforms, sidewalks, steps, and ramps, and elsewhere as indicated.
    a. Immediately after float finishing, slightly roughen concrete surface bybrooming with fiber-bristle broom perpendicular to main traffic route.
    b. Match existing adjacent concrete finishes.

I. Curing: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, apply an evaporation-control compound according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
1. Begin initial curing as soon as free water has disappeared from exposedsurfaces.
2. Continue curing unformed concrete surfaces by water ponding, continuous fog spraying, continuously wetted absorptive cover, or by moisture-retaining cover curing. Cure formed surfaces by moist curing until forms are removed. Keep concrete continuously moist for not less than 72 hours for high-early strength concrete and seven (7) days for all other concrete.

J. Field Quality Control: The Contractor will employ a testing agency to perform tests and to submit test reports. Sampling and testing for quality control during concrete placement may include the following, as directed by the Engineer.
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
    a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete: additional tests when concrete consistency seems to have changed.
    b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
    c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
    d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
    e. Compressive-Strength Tests: ASTM C 39; one set for the first pour plus one additional set as directed by the Engineer.
2. The Contractor shall be responsible for notifying the testing laboratory when pours are to be made and shall cooperate with the testing laboratory concerning the storage of test cylinders and performance of their work.
3. When frequency of testing will provide fewer than five (5) strength tests for a given class of concrete, conduct testing from at least (5) randomly selected batches or from each batch if fewer than five are used.
4. Test results will be reported in writing to the Engineer, ready-mix producer, and Contractor within twenty-four (24) hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure,

design compressive strength at twenty-eight (28) days, concrete mix proportions and materials, compressive breaking strength, and type of bread for both seven (7) day tests and twenty-eight (28) day tests.

5. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
6. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

Appendix

Notice of Award
Change Order
Certificate of Substantial Completion
State Tax Affidavit
Noncollusion Affidavit
Nondiscrimination Affidavit
Letter of Intent SOMWBA Certified Enterprise
SOMWBA Certified Enterprise (SCE) Participation Schedule
Statement of Compliance
Prevailing Wage Rates
Conservation Commission – Order of Conditions (pending)

NOTICE OF AWARD

Dated _____

TO: _____
(BIDDER)

ADDRESS: _____

_____

_____

Contact: **Town of Williamstown**
(Insert name of Contact as it appears in the Bidding Documents)

Project: **SOUTH STREET RECONSTRUCTION PROJECT**

OWNER's Contract No. _____

You are notified that your Bid dated _____ for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a Contract for _____

_____

_____

The Contract Price of your Contract is _____

_____ Dollars ($ _____).

[Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts]

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award. _____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within fifteen days of the date of this Notice of Award, that is by _____ .

1. Deliver to the OWNER _____ fully executed counterparts of the Contract Documents. [Each of the Contract Documents must bear your signature.]

2. Deliver with the executed Contract Documents the Contract security (Bonds) as specified in the Instructions to Bidders, General Conditions and Supplementary Conditions.

EJCDC No. 1910-22 (1996 Edition)
Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America and the Construction Specifications Institute.

3. (List other conditions precedent).

Failure to comply with these conditions within the time specified will entitle OWNER to consider your Bid in default, to annul this Notice of Award and to declare your Bid security forfeited.

Within ten days after you comply with the above conditions, OWNER will return to you two fully executed counterpart of the Contract Documents.

_____
(OWNER)

By: _____
(AUTHORIZED SIGNATURE)

_____
(TITLE)

Copy to ENGINEER
(Use Certified Mail,
Return Receipt Requested)

CHANGE ORDER NO.

Project: **SOUTH STREET RECONSTRUCTION PROJECT**
Williamstown, Massachusetts

Contractor

You are directed to make the following changes in the Contract Documents.

Description:

Purpose of
Change order:

Attachments:

CHANGE ORDER CON'T

Change in Contract Price		Change in Contract Time	
Original Contract Price $	_____	Original Contract Time	_____
Previous change orders $	_____	Previous change orders	_____
Contract Price to Date $	_____	Contract Time to Date	_____
Net Increase/ (Decrease) $ this change order	_____	Net Increase/ (Decrease) this change order	_____
Contract Price with all approved changes $	_____	Contract Time with all approved changes	_____

Approved by:

Approved by:

Town of Williamstown	Date	Contractor	Date

Approved by:

Landscape Architect/Engineer Date

TOTAL CHANGE ORDERS CANNOT EXCEED
TWENTY FIVE PERCENT (25%) OF ORIGINAL BID

CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE _____

OWNER _____
CONTRACTOR _____
Contract: _____
Project: _____

OWNER's Contract No. _____ENGINEER's Project No. _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To_____
OWNER

And To _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

EJCDC No. 1910-8-D (1996 Edition)
Prepared by the Engineers' Joint Contract Documents Committee and endorsed by The Associated General Contractors of America and the Construction Specifications Institute.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees shall be as follows:

OWNER: _____

_____

_____

CONTRACTOR: _____

_____

_____

_____

The following documents are attached to and made a part of this Certificate:

[For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by Contract Documents.]

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____
Date

_____
Engineer

_____
By (Authorized Signature)

CONTRACTOR accepts this Certificate of Substantial Completion on _____
Date

_____
Contractor

_____
By (Authorized Signature)

OWNER accepts this Certificate of Substantial Completion on _____
Date

_____
OWNER

_____
By (Authorized Signature)

STATE TAX AFFIDAVIT

Project: SOUTH STREET RECONSTRUCTION PROJECT
WILLIAMSTOWN, MASSACHUSETTS

Commonwealth of Massachusetts
County of BERKSHIRE

The undersigned being duly sworn, deposes and says that he is the sole owner, partner, president, treasurer, or other duly authorized agent or official of

Name of bidder as appearing in submitted proposal

Address of bidder

Telephone number of bidder

Social Security or Federal ID #

and certifies, **UNDER THE PENALTIES OF PERJURY,** pursuant to Massachusetts General Laws, Chapter 62C, Section 49A, that to the best of his knowledge and belief, said bidder has filed all Massachusetts tax returns and paid all Massachusetts taxes required by law.

Signed under penalties of perjury

Title

Date

Sworn to before me this _____ day of _____ , 20 _____

Notary Public
My commission expires
_____ , 20 _____

NONCOLLUSION AFFIDAVIT

Project: SOUTH STREET RECONSTRUCTION PROJECT
WILLIAMSTOWN, MASSACHUSETTS

Commonwealth of Massachusetts
County of BERKSHIRE

The undersigned being duly sworn, deposes and states that he is the sole owner, partner, president, treasurer, or other duly authorized agent or official of

Name of bidder as appearing in submitted proposal

Address of bidder

Telephone number of bidder

Social Security
or Federal ID #

and certifies, **UNDER THE PENALTIES OF PERJURY,** that to the best of his knowledge and belief, said bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal. It is understood that the signing of this AFFIDAVIT is applicable to all projects for which bids are being submitted in a multi-bid proposal.

Signed under penalties of perjury

Title

Date

Sworn to before me this _____ day of _____ , 20 _____

Notary Public
My commission expires
_____ , 20 _____

NONDISCRIMINATION AFFIDAVIT

Project: SOUTH STREET RECONSTRUCTION PROJECT
WILLIAMSTOWN, MASSACHUSETTS

Commonwealth of Massachusetts
County of BERKSHIRE

The undersigned being duly sworn, deposes and states that he is the sole owner, partner, president, treasurer, or other duly authorized agent or official of

Name of bidder as appearing in submitted proposal

Address of bidder

Telephone number of bidder

Social Security
or Federal ID #

and certifies, **UNDER THE PENALTIES OF PERJURY,** that to the best of his knowledge and belief, said bidder has not, either directly or indirectly, discriminated against any employee or applicant for employee because of his/her race, color, creed, age, sex or national origin. Additionally, bidder has complied with all provisions and requirements of the Equal Opportunity, Antidiscrimination and Affirmative Action Programs.

Signed under penalties of perjury

Title

Date

Sworn to before me this _____ day of _____ , 20 _____

Notary Public
My commission expires
_____ , 20 _____

LETTER OF INTENT
SOMWBA CERTIFIED ENTERPRISE

This form is provided for SOMWBA Certified Enterprises (SCEs) being utilized as MBEs and WBEs on this contract.

This form must be completed by each SOMWBA Certified Enterprise and submitted by the bidder using the SCE. General bidders or filed sub-bidders that are SCEs may omit this form.

TO:	**General Bidder**	**FROM:**	**SCE**
Name:	_____	Name:	_____
Street Address:	_____	Street Address:	_____
City/Town:	_____	City/Town:	_____
Phone:	_____	Phone:	_____
Fax:	_____	Fax:	_____

RE: State-Aided Project _____
(Name of Housing Authority and Project Number)

1. My company intends to perform work in connection with the above project as:

☐ an individual ☐ a corporation ☐ a partnership
☐ a joint venture with _____
☐ other (explain) _____

2. My company is certified by SOMWBA as a ☐ MBE ☐ WBE in the following categories:

WARNING:

Misrepresenting your firm's SOMWBA certification may result in disqualification from this and other DHCD funded projects.

_____
_____
_____
_____

3. My company has not changed its ownership, control, or management in any ways that affect certification since obtaining SOMWBA certification.

4. My company understands that if your company is awarded the contract, your company intends to enter into an agreement to perform the work described below for the price indicated. My company also understands that your company will make substitutions only as allowed by Article 15 of the General Conditions for the above project.

5. My company intends to _____
(Brief description of work)

_____
_____

This Work includes: ☐ Labor & Materials ☐ Labor Only ☐ Materials Only

for a total amount of _____ dollars ($_____)

Date: _____ _____
(Authorized signature of SCE)

_____
Name and Title

SOMWBA CERTIFIED ENTERPRISE (SCE) PARTICIPATION SCHEDULE

This form must be submitted by the apparent low general bidder within five working days of receipt of bids.

Filed subbidders who are SOMWBA certified MBEs or WBEs or filed subcontractors who intend to sub-subcontract with a SOMWBA certified MBE or WBE may submit this form with their Filed sub-bid.

Letters of Intent from all SCEs listed must be submitted with this Participation Schedule.

State-Aided Project _____
(number) (City or Town)

The undersigned intends to subcontract with the following firms for the listed work and dollar amounts:

Name of Company	Description of Work	MBE or WBE	Supplier or Subcontractor	Dollar Value of Participation
1.				$
2.				$
3.				$
4.				$
5.				$
6.				$
7.				$
8.				$
9.				$
10.				$

Dollar Value of MBE Commitment: $ _____

Dollar Value of WBE Commitment: $ _____

Total Dollar Value Commitment: $ _____

Date _____

_____
(Name of General Contractor)

_____
(Authorized Signature)

_____
(Address)

_____
(City, State & Zip Code)

STATEMENT OF COMPLIANCE

Project: **SOUTH STREET RECONSTRUCTION PROJECT**
Town of Williamstown, Massachusetts

Commonwealth of Massachusetts
County of _____

I do hereby state, UNDER PENALTIES OF PERJURY, that I pay or supervise the payment of persons employed by:

_____
Name of contractor or subcontractor

_____

_____
Address of contractor or subcontractor

On the above stated project and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of MGL Chapter 149 Sections 27/27A.

Signed under penalties of perjury

_____

_____ _____
Title Date

In accordance with MGL Chapter 149, Section 27B "Each such contractor, subcontractor or public body shall furnish to the Commissioner of Labor and Industries within fifteen days after completion of its portion of the work, a statement executed by the contractor, subcontractor or public body or by any authorized officer or employee of the contractor, subcontractor or public body who supervises the payment of wages.

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

MAURA HEALEY
Governor

KIM DRISCOLL
Lt. Governor

LAUREN JONES
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: Town of Williamstown

Contract Number:

City/Town: WILLIAMSTOWN

Description of Work: Reconstruction of road. Install new storm drain/sewer structures and piping. Installation of new sidewalk with crosswalk flashing beacons. Installation of new curbing with repaving road.

Job Location: South Street Williamstown Ma. 01267

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.
- This annual update requirement is generally not applicable to 27F "rental of equipment" contracts. For such contracts, the prevailing wage rates issued by DLS shall remain in effect for the duration of the contract term. However, if the prevailing wage rate sheet issued does not contain wage rates for each year covered by the contract term, the Awarding Authority must request updated rate sheets from DLS and provide them to the contractor to ensure the correct rates are being paid throughout the duration of the contract. Additionally, if an Awarding Authority exercises an option to renew or extend the contract term, they must request updated rate sheets form DLS and provide them to the contractor.
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27.The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

Issue Date: 01/09/2025 **Wage Request Number:** 20250109-036

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$39.95	$15.57	$20.17	$0.00	$75.69
	06/01/2025	$40.95	$15.57	$20.17	$0.00	$76.69
	12/01/2025	$40.95	$15.57	$21.78	$0.00	$78.30
	01/01/2026	$40.95	$16.17	$21.78	$0.00	$78.90
	06/01/2026	$41.95	$16.17	$21.78	$0.00	$79.90
	12/01/2026	$41.95	$16.17	$23.52	$0.00	$81.64
	01/01/2027	$41.95	$16.77	$23.52	$0.00	$82.24
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$40.02	$15.57	$20.17	$0.00	$75.76
	06/01/2025	$41.02	$15.57	$20.17	$0.00	$76.76
	12/01/2025	$41.02	$15.57	$21.78	$0.00	$78.37
	01/01/2026	$41.02	$16.17	$21.78	$0.00	$78.97
	06/01/2026	$42.02	$16.17	$21.78	$0.00	$79.97
	12/01/2026	$42.02	$16.17	$23.52	$0.00	$81.71
	01/01/2027	$42.02	$16.77	$23.52	$0.00	$82.31
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$40.14	$15.57	$20.17	$0.00	$75.88
	06/01/2025	$41.14	$15.57	$20.17	$0.00	$76.88
	12/01/2025	$41.14	$15.57	$21.78	$0.00	$78.49
	01/01/2026	$41.14	$16.17	$21.78	$0.00	$79.09
	06/01/2026	$42.14	$16.17	$21.78	$0.00	$80.09
	12/01/2026	$42.14	$16.17	$23.52	$0.00	$81.83
	01/01/2027	$42.14	$16.77	$23.52	$0.00	$82.43
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2024	$117.16	$10.08	$24.29	$0.00	$151.53
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.79	$9.65	$14.53	$0.00	$56.97
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$35.24	$9.65	$15.60	$0.00	$60.49
	06/01/2025	$36.48	$9.65	$15.60	$0.00	$61.73
	12/01/2025	$37.71	$9.65	$15.60	$0.00	$62.96
	06/01/2026	$39.75	$9.65	$15.60	$0.00	$65.00
	12/01/2026	$41.04	$9.65	$15.60	$0.00	$66.29
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS WORKER (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)*	12/01/2024	$38.52	$14.50	$10.55	$0.00	$63.57
	06/01/2025	$39.42	$14.50	$10.55	$0.00	$64.47
	12/01/2025	$40.32	$14.50	$10.55	$0.00	$65.37
ASPHALT RAKER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.74	$9.65	$15.60	$0.00	$59.99
	06/01/2025	$35.98	$9.65	$15.60	$0.00	$61.23
	12/01/2025	$37.21	$9.65	$15.60	$0.00	$62.46
	06/01/2026	$39.25	$9.65	$15.60	$0.00	$64.50
	12/01/2026	$40.54	$9.65	$15.60	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
AUTOMATIC GRADER-EXCAVATOR (RECLAIMER) *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
BACKHOE/FRONT-END LOADER OPERATOR *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 4 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47
BATCH/CEMENT PLANT - ON SITE *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 4 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2024	$32.79	$9.65	$14.53	$0.00	$56.97
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)* For apprentice rates see "Apprentice- LABORER (Heavy and Highway)	12/01/2024	$35.24	$9.65	$15.60	$0.00	$60.49
	06/01/2025	$36.48	$9.65	$15.60	$0.00	$61.73
	12/01/2025	$37.71	$9.65	$15.60	$0.00	$62.96
	06/01/2026	$39.75	$9.65	$15.60	$0.00	$65.00
	12/01/2026	$41.04	$9.65	$15.60	$0.00	$66.29
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2024	$48.12	$7.07	$20.60	$0.00	$75.79

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$31.28	$7.07	$13.22	$0.00	$51.57
2	65	$31.28	$7.07	$13.22	$0.00	$51.57
3	70	$33.68	$7.07	$14.23	$0.00	$54.98
4	75	$36.09	$7.07	$15.24	$0.00	$58.40
5	80	$38.50	$7.07	$16.25	$0.00	$61.82
6	85	$40.90	$7.07	$17.28	$0.00	$65.25
7	90	$43.31	$7.07	$18.28	$0.00	$68.66
8	95	$45.71	$7.07	$19.32	$0.00	$72.10

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)*	08/01/2024	$52.06	$11.49	$21.46	$0.00	$85.01
	02/01/2025	$53.36	$11.49	$21.46	$0.00	$86.31
	08/01/2025	$55.51	$11.49	$21.46	$0.00	$88.46
	02/01/2026	$56.86	$11.49	$21.46	$0.00	$89.81
	08/01/2026	$59.06	$11.49	$21.46	$0.00	$92.01
	02/01/2027	$60.46	$11.49	$21.46	$0.00	$93.41

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Springfield/Pittsfield*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.03	$11.49	$21.46	$0.00	$58.98
2	60	$31.24	$11.49	$21.46	$0.00	$64.19
3	70	$36.44	$11.49	$21.46	$0.00	$69.39
4	80	$41.65	$11.49	$21.46	$0.00	$74.60
5	90	$46.85	$11.49	$21.46	$0.00	$79.80

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.68	$11.49	$21.46	$0.00	$59.63
2	60	$32.02	$11.49	$21.46	$0.00	$64.97
3	70	$37.35	$11.49	$21.46	$0.00	$70.30
4	80	$42.69	$11.49	$21.46	$0.00	$75.64
5	90	$48.02	$11.49	$21.46	$0.00	$80.97

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/POWER SHOVEL/TREE SHREDDER /CLAM SHELL*OPERATING*	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
ENGINEERS LOCAL 98						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN	12/01/2024	$48.10	$9.65	$18.22	$0.00	$75.97
LABORERS - FOUNDATION AND MARINE	06/01/2025	$49.60	$9.65	$18.22	$0.00	$77.47
	12/01/2025	$51.10	$9.65	$18.22	$0.00	$78.97
	06/01/2026	$52.65	$9.65	$18.22	$0.00	$80.52
	12/01/2026	$54.15	$9.65	$18.22	$0.00	$82.02
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER	12/01/2024	$46.95	$9.65	$18.22	$0.00	$74.82
LABORERS - FOUNDATION AND MARINE	06/01/2025	$48.45	$9.65	$18.22	$0.00	$76.32
	12/01/2025	$49.95	$9.65	$18.22	$0.00	$77.82
	06/01/2026	$51.50	$9.65	$18.22	$0.00	$79.37
	12/01/2026	$53.00	$9.65	$18.22	$0.00	$80.87
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
LABORERS - FOUNDATION AND MARINE	06/01/2025	$48.78	$9.65	$18.22	$0.00	$76.65
	12/01/2025	$50.28	$9.65	$18.22	$0.00	$78.15
	06/01/2026	$51.83	$9.65	$18.22	$0.00	$79.70
	12/01/2026	$53.33	$9.65	$18.22	$0.00	$81.20
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47
LABORERS - ZONE 4 (BUILDING & SITE)						
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER *CARPENTERS LOCAL 336 - BERKSHIRE COUNTY*	09/01/2024	$42.36	$7.91	$18.15	$0.00	$68.42
	03/01/2025	$43.26	$7.91	$18.15	$0.00	$69.32
	09/01/2025	$44.21	$7.91	$18.15	$0.00	$70.27
	03/01/2026	$45.11	$7.91	$18.15	$0.00	$71.17
	09/01/2026	$46.06	$7.91	$18.15	$0.00	$72.12
	03/01/2027	$46.96	$7.91	$18.15	$0.00	$73.02

Apprentice - *CARPENTER - Local 336 Berkshire*

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$19.06	$7.91	$1.40	$0.00	$28.37
2	45	$19.06	$7.91	$1.40	$0.00	$28.37
3	55	$23.30	$7.91	$2.76	$0.00	$33.97
4	55	$23.30	$7.91	$2.76	$0.00	$33.97
5	70	$29.65	$7.91	$15.39	$0.00	$52.95
6	70	$29.65	$7.91	$15.39	$0.00	$52.95
7	80	$33.89	$7.91	$16.77	$0.00	$58.57
8	80	$33.89	$7.91	$16.77	$0.00	$58.57

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$19.47	$7.91	$1.40	$0.00	$28.78
2	45	$19.47	$7.91	$1.40	$0.00	$28.78
3	55	$23.79	$7.91	$2.76	$0.00	$34.46
4	55	$23.79	$7.91	$2.76	$0.00	$34.46
5	70	$30.28	$7.91	$15.39	$0.00	$53.58
6	70	$30.28	$7.91	$15.39	$0.00	$53.58
7	80	$34.61	$7.91	$16.77	$0.00	$59.29
8	80	$34.61	$7.91	$16.77	$0.00	$59.29

Notes:

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME *CARPENTERS-ZONE 3 (Wood Frame)*	10/01/2024	$26.65	$7.02	$4.80	$0.00	$38.47
	10/01/2025	$27.75	$7.02	$4.80	$0.00	$39.57
	10/01/2026	$28.85	$7.02	$4.80	$0.00	$40.67

All Aspects of New Wood Frame Work

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

Effective Date - 10/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$15.99	$7.02	$0.00	$0.00	$23.01
2	60	$15.99	$7.02	$0.00	$0.00	$23.01
3	65	$17.32	$7.02	$1.00	$0.00	$25.34
4	70	$18.66	$7.02	$1.00	$0.00	$26.68
5	75	$19.99	$7.02	$4.80	$0.00	$31.81
6	80	$21.32	$7.02	$4.80	$0.00	$33.14
7	85	$22.65	$7.02	$4.80	$0.00	$34.47
8	90	$23.99	$7.02	$4.80	$0.00	$35.81

Effective Date - 10/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$16.65	$7.02	$0.00	$0.00	$23.67
2	60	$16.65	$7.02	$0.00	$0.00	$23.67
3	65	$18.04	$7.02	$1.00	$0.00	$26.06
4	70	$19.43	$7.02	$1.00	$0.00	$27.45
5	75	$20.81	$7.02	$4.80	$0.00	$32.63
6	80	$22.20	$7.02	$4.80	$0.00	$34.02
7	85	$23.59	$7.02	$4.80	$0.00	$35.41
8	90	$24.98	$7.02	$4.80	$0.00	$36.80

Notes:

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)*	01/01/2024	$44.68	$12.90	$18.66	$1.25	$77.49

Apprentice - *CEMENT MASONRY/PLASTERING - Springfield/Pittsfield*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.34	$12.90	$15.86	$0.00	$51.10
2	60	$26.81	$12.90	$18.66	$1.25	$59.62
3	65	$29.04	$12.90	$18.66	$1.25	$61.85
4	70	$31.28	$12.90	$18.66	$1.25	$64.09
5	75	$33.51	$12.90	$18.66	$1.25	$66.32
6	80	$35.74	$12.90	$18.66	$1.25	$68.55
7	90	$40.21	$12.90	$18.66	$1.25	$73.02

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 4 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
CRANE OPERATOR *OPERATING ENGINEERS LOCAL 98* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	$43.06	$13.78	$15.15	$0.00	$71.99
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 3*	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$29.23	$9.95	$0.00	$0.00	$39.18
2	55	$32.15	$9.95	$6.66	$0.00	$48.76
3	60	$35.08	$9.95	$7.26	$0.00	$52.29
4	65	$38.00	$9.95	$7.87	$0.00	$55.82
5	70	$40.92	$9.95	$20.32	$0.00	$71.19
6	75	$43.85	$9.95	$20.93	$0.00	$74.73
7	80	$46.77	$9.95	$21.53	$0.00	$78.25
8	90	$52.61	$9.95	$22.74	$0.00	$85.30

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 4 (BUILDING & SITE)* For apprentice rates see "Apprentice- LABORER"	12/02/2024	$47.00	$9.65	$18.40	$0.00	$75.05
	06/02/2025	$48.50	$9.65	$18.40	$0.00	$76.55
	12/01/2025	$50.00	$9.65	$18.40	$0.00	$78.05
	06/01/2026	$51.55	$9.65	$18.40	$0.00	$79.60
	12/07/2026	$53.05	$9.65	$18.40	$0.00	$81.10
	06/07/2027	$54.65	$9.65	$18.40	$0.00	$82.70
	12/06/2027	$56.25	$9.65	$18.40	$0.00	$84.30
	06/05/2028	$57.93	$9.65	$18.40	$0.00	$85.98
	12/04/2028	$59.60	$9.65	$18.40	$0.00	$87.65
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 4 (BUILDING & SITE)*	12/02/2024	$48.00	$9.65	$18.40	$0.00	$76.05
	06/02/2025	$49.50	$9.65	$18.40	$0.00	$77.55
	12/01/2025	$51.00	$9.65	$18.40	$0.00	$79.05
	06/01/2026	$52.55	$9.65	$18.40	$0.00	$80.60
	12/07/2026	$54.05	$9.65	$18.40	$0.00	$82.10
	06/07/2027	$55.65	$9.65	$18.40	$0.00	$83.70
	12/06/2027	$57.25	$9.65	$18.40	$0.00	$85.30
	06/05/2028	$58.93	$9.65	$18.40	$0.00	$86.98
	12/04/2028	$60.60	$9.65	$18.40	$0.00	$88.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS *LABORERS - ZONE 4 (BUILDING & SITE)*	12/02/2024	$47.75	$9.65	$18.40	$0.00	$75.80
	06/02/2025	$49.25	$9.65	$18.40	$0.00	$77.30
	12/01/2025	$50.75	$9.65	$18.40	$0.00	$78.80
	06/01/2026	$52.30	$9.65	$18.40	$0.00	$80.35
	12/07/2026	$53.80	$9.65	$18.40	$0.00	$81.85
	06/07/2027	$55.40	$9.65	$18.40	$0.00	$83.45
	12/06/2027	$57.00	$9.65	$18.40	$0.00	$85.05
	06/05/2028	$58.68	$9.65	$18.40	$0.00	$86.73
	12/04/2028	$60.35	$9.65	$18.40	$0.00	$88.40
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/02/2024	$48.00	$9.65	$18.40	$0.00	$76.05
	06/02/2025	$49.50	$9.65	$18.40	$0.00	$77.55
	12/01/2025	$51.00	$9.65	$18.40	$0.00	$79.05
	06/01/2026	$52.55	$9.65	$18.40	$0.00	$80.60
	12/07/2026	$54.05	$9.65	$18.40	$0.00	$82.10
	06/07/2027	$55.65	$9.65	$18.40	$0.00	$83.70
	12/06/2027	$57.25	$9.65	$18.40	$0.00	$85.30
	06/05/2028	$58.93	$9.65	$18.40	$0.00	$86.98
	12/04/2028	$60.60	$9.65	$18.40	$0.00	$88.65
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 4 (BUILDING & SITE)*	12/02/2024	$47.75	$9.65	$18.40	$0.00	$75.80
	06/02/2025	$49.25	$9.65	$18.40	$0.00	$77.30
	12/01/2025	$50.75	$9.65	$18.40	$0.00	$78.80
	06/01/2026	$52.30	$9.65	$18.40	$0.00	$80.35
	12/07/2026	$53.80	$9.65	$18.40	$0.00	$81.85
	06/07/2027	$55.40	$9.65	$18.40	$0.00	$83.45
	12/06/2027	$57.00	$9.65	$18.40	$0.00	$85.05
	06/05/2028	$58.68	$9.65	$18.40	$0.00	$86.73
	12/04/2028	$60.35	$9.65	$18.40	$0.00	$88.40
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/02/2024	$47.00	$9.65	$18.40	$0.00	$75.05
	06/02/2025	$48.50	$9.65	$18.40	$0.00	$76.55
	12/01/2025	$50.00	$9.65	$18.40	$0.00	$78.05
	06/01/2026	$51.55	$9.65	$18.40	$0.00	$79.60
	12/07/2026	$53.05	$9.65	$18.40	$0.00	$81.10
	06/07/2027	$54.65	$9.65	$18.40	$0.00	$82.70
	12/06/2027	$56.25	$9.65	$18.40	$0.00	$84.30
	06/05/2028	$57.93	$9.65	$18.40	$0.00	$85.98
	12/04/2028	$59.60	$9.65	$18.40	$0.00	$87.65
For apprentice rates see "Apprentice- LABORER"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2024	$78.11	$10.08	$24.29	$0.00	$112.48
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Diver wage 70/80/90 2A $69.83, 3A $91.79,4A $102.14 Total Rate						
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2024	$49.19	$10.08	$24.29	$0.00	$83.56

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Piledriver wage 70/80/90 2A $54.20, 3A $73.93,4A $82.05 Total Rate						
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2024	$83.69	$10.08	$24.29	$0.00	$118.06
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 3)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2024	$117.16	$10.08	$24.29	$0.00	$151.53
DRAWBRIDGE OPERATOR (Construction) *DRAWBRIDGE - SEIU LOCAL 888*	07/01/2020	$26.77	$6.67	$3.93	$0.16	$37.53
ELECTRICIAN (Including Core Drilling) *ELECTRICIANS LOCAL 7*	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37

Apprentice - *ELECTRICIAN - Local 7*

Effective Date - 12/29/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.42	$7.35	$0.61	$0.00	$28.38
2	45	$22.98	$7.35	$0.69	$0.00	$31.02
3	50	$25.53	$13.25	$7.47	$0.00	$46.25
4	55	$28.08	$13.25	$7.54	$0.00	$48.87
5	65	$33.19	$13.25	$9.74	$0.00	$56.18
6	70	$35.74	$13.25	$11.19	$0.00	$60.18

Effective Date - 06/29/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.86	$7.50	$0.63	$0.00	$28.99
2	45	$23.47	$7.50	$0.70	$0.00	$31.67
3	50	$26.08	$13.50	$7.53	$0.00	$47.11
4	55	$28.69	$13.50	$7.61	$0.00	$49.80
5	65	$33.90	$13.50	$9.84	$0.00	$57.24
6	70	$36.51	$13.50	$11.30	$0.00	$61.31

Notes:

Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

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

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 41*	01/01/2025	$62.83	$16.28	$21.36	$0.00	$100.47
	01/01/2026	$63.68	$16.38	$21.76	$0.00	$101.82
	01/01/2027	$64.53	$16.48	$22.16	$0.00	$103.17

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 41*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.42	$16.28	$0.00	$0.00	$47.70
2	55	$34.56	$16.28	$21.36	$0.00	$72.20
3	65	$40.84	$16.28	$21.36	$0.00	$78.48
4	70	$43.98	$16.28	$21.36	$0.00	$81.62
5	80	$50.26	$16.28	$21.36	$0.00	$87.90

Effective Date - 01/01/2026

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.84	$16.38	$0.00	$0.00	$48.22
2	55	$35.02	$16.38	$21.76	$0.00	$73.16
3	65	$41.39	$16.38	$21.76	$0.00	$79.53
4	70	$44.58	$16.38	$21.76	$0.00	$82.72
5	80	$50.94	$16.38	$21.76	$0.00	$89.08

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 41*	01/01/2025	$43.98	$16.28	$21.36	$0.00	$81.62
	01/01/2026	$44.58	$16.38	$21.76	$0.00	$82.72
	01/01/2027	$45.17	$16.48	$22.16	$0.00	$83.81
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & BEAM RAIL ERECTOR *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.04	$9.65	$14.53	$0.00	$56.22
For apprentice rates see "Apprentice- LABORER"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.74	$9.65	$15.60	$0.00	$59.99
	06/01/2025	$35.98	$9.65	$15.60	$0.00	$61.23
	12/01/2025	$37.21	$9.65	$15.60	$0.00	$62.46
	06/01/2026	$39.25	$9.65	$15.60	$0.00	$64.50
	12/01/2026	$40.54	$9.65	$15.60	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST/ROD-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$18.84	$4.80	$4.10	$0.00	$27.74
FIELD ENG.PARTY CHIEF:BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$21.33	$4.80	$4.10	$0.00	$30.23
FIELD ENG.SURVEY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 98*	06/01/1999	$22.33	$4.80	$4.10	$0.00	$31.23
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 7*	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37
For apprentice rates see "Apprentice- ELECTRICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING *ELECTRICIANS LOCAL 7*	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96

Apprentice - *OPERATING ENGINEERS - Local 98 Class 3*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$23.42	$13.78	$15.15	$0.00	$52.35
2	70	$27.32	$13.78	$15.15	$0.00	$56.25
3	80	$31.22	$13.78	$15.15	$0.00	$60.15
4	90	$35.13	$13.78	$15.15	$0.00	$64.06

Notes:

Steps 1-2 are 1000 hrs.; Steps 3-4 are 2000 hrs.

Apprentice to Journeyworker Ratio:1:6

FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$26.51	$9.65	$15.60	$0.00	$51.76
	06/01/2025	$27.59	$9.65	$15.60	$0.00	$52.84
	12/01/2025	$27.59	$9.65	$15.60	$0.00	$52.84
	06/01/2026	$28.71	$9.65	$15.60	$0.00	$53.96
	12/01/2026	$28.71	$9.65	$15.60	$0.00	$53.96
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE III*	09/01/2024	$42.36	$7.91	$18.15	$0.00	$68.42
	03/01/2025	$43.26	$7.91	$18.15	$0.00	$69.32
	09/01/2025	$44.21	$7.91	$18.15	$0.00	$70.27
	03/01/2026	$45.11	$7.91	$18.15	$0.00	$71.17
	09/01/2026	$46.06	$7.91	$18.15	$0.00	$72.12
	03/01/2027	$46.96	$7.91	$18.15	$0.00	$73.02

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone III*

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.18	$7.91	$1.38	$0.00	$30.47
2	55	$23.30	$7.91	$1.38	$0.00	$32.59
3	60	$25.42	$7.91	$2.76	$0.00	$36.09
4	65	$27.53	$7.91	$2.76	$0.00	$38.20
5	70	$29.65	$7.91	$15.39	$0.00	$52.95
6	75	$31.77	$7.91	$15.39	$0.00	$55.07
7	80	$33.89	$7.91	$16.77	$0.00	$58.57
8	85	$36.01	$7.91	$16.77	$0.00	$60.69

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.63	$7.91	$1.38	$0.00	$30.92
2	55	$23.79	$7.91	$1.38	$0.00	$33.08
3	60	$25.96	$7.91	$2.76	$0.00	$36.63
4	65	$28.12	$7.91	$2.76	$0.00	$38.79
5	70	$30.28	$7.91	$15.39	$0.00	$53.58
6	75	$32.45	$7.91	$15.39	$0.00	$55.75
7	80	$34.61	$7.91	$16.77	$0.00	$59.29
8	85	$36.77	$7.91	$16.77	$0.00	$61.45

Notes: Steps are 750 hrs.
% After 10/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 $26.72.24/ 3&4 $32.11/ 5&6 $50.75/ 7&8 $56.14

Apprentice to Journeyworker Ratio:1:1

FORK LIFT *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.25	$13.78	$15.15	$0.00	$68.18

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GENERATORS/LIGHTING PLANTS *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$35.80	$13.78	$15.15	$0.00	$64.73

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 1333*	06/01/2020	$39.18	$10.80	$10.45	$0.00	$60.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 1333*

Effective Date - 06/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.59	$10.80	$1.80	$0.00	$32.19
2	56	$22.04	$10.80	$1.80	$0.00	$34.64
3	63	$24.49	$10.80	$2.45	$0.00	$37.74
4	69	$26.94	$10.80	$2.45	$0.00	$40.19
5	75	$29.39	$10.80	$3.15	$0.00	$43.34
6	81	$31.83	$10.80	$3.15	$0.00	$45.78
7	88	$34.28	$10.80	$10.45	$0.00	$55.53
8	94	$36.73	$10.80	$10.45	$0.00	$57.98

Notes:

Apprentice to Journeyworker Ratio:1:3

GRADER/TRENCHING MACHINE/DERRICK *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 63*	01/01/2025	$42.23	$12.20	$18.74	$2.13	$75.30
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 7*	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 63*	01/01/2025	$42.23	$12.20	$18.74	$2.13	$75.30
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$35.24	$9.65	$15.60	$0.00	$60.49
	06/01/2025	$36.48	$9.65	$15.60	$0.00	$61.73
	12/01/2025	$37.71	$9.65	$15.60	$0.00	$62.96
	06/01/2026	$39.75	$9.65	$15.60	$0.00	$65.00
	12/01/2026	$41.04	$9.65	$15.60	$0.00	$66.29
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)*	09/01/2024	$45.54	$14.75	$19.61	$0.00	$79.90
	09/01/2025	$48.27	$14.75	$19.61	$0.00	$82.63
	09/01/2026	$51.01	$14.75	$19.61	$0.00	$85.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

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

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.77	$14.75	$14.32	$0.00	$51.84
2	60	$27.32	$14.75	$15.37	$0.00	$57.44
3	70	$31.88	$14.75	$16.43	$0.00	$63.06
4	80	$36.43	$14.75	$17.49	$0.00	$68.67

Effective Date - 09/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.14	$14.75	$14.32	$0.00	$53.21
2	60	$28.96	$14.75	$15.37	$0.00	$59.08
3	70	$33.79	$14.75	$16.43	$0.00	$64.97
4	80	$38.62	$14.75	$17.49	$0.00	$70.86

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER — 07/01/2019 — $31.55 — $6.75 — $19.66 — $0.00 — $57.96
IRONWORKERS LOCAL 12

Apprentice - *IRONWORKER - Local 12*

Effective Date - 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$18.93	$6.75	$3.50	$0.00	$29.18
2	70	$22.09	$6.75	$14.64	$0.00	$43.48
3	80	$25.24	$6.75	$16.22	$0.00	$48.21
4	90	$28.40	$6.75	$17.82	$0.00	$52.97

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

JACKHAMMER & PAVING BREAKER OPERATOR — 12/01/2024 — $32.29 — $9.65 — $14.53 — $0.00 — $56.47
LABORERS - ZONE 4 (BUILDING & SITE)

For apprentice rates see "Apprentice- LABORER"

LABORER — 12/01/2024 — $32.04 — $9.65 — $14.53 — $0.00 — $56.22
LABORERS - ZONE 4 (BUILDING & SITE)

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 4 Building and Site*

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$19.22	$9.65	$14.53	$0.00	$43.40
2	70	$22.43	$9.65	$14.53	$0.00	$46.61
3	80	$25.63	$9.65	$14.53	$0.00	$49.81
4	90	$28.84	$9.65	$14.53	$0.00	$53.02

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.49	$9.65	$15.60	$0.00	$59.74
	06/01/2025	$35.73	$9.65	$15.60	$0.00	$60.98
	12/01/2025	$36.96	$9.65	$15.60	$0.00	$62.21
	06/01/2026	$39.00	$9.65	$15.60	$0.00	$64.25
	12/01/2026	$40.29	$9.65	$15.60	$0.00	$65.54

Apprentice - *LABORER (Heavy and Highway) - Zone 4*

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.69	$9.65	$15.60	$0.00	$45.94
2	70	$24.14	$9.65	$15.60	$0.00	$49.39
3	80	$27.59	$9.65	$15.60	$0.00	$52.84
4	90	$31.04	$9.65	$15.60	$0.00	$56.29

Effective Date - 06/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.44	$9.65	$15.60	$0.00	$46.69
2	70	$25.01	$9.65	$15.60	$0.00	$50.26
3	80	$28.58	$9.65	$15.60	$0.00	$53.83
4	90	$32.16	$9.65	$15.60	$0.00	$57.41

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.04	$9.65	$14.53	$0.00	$56.22

For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.04	$9.65	$14.53	$0.00	$56.22

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$33.16	$9.65	$14.41	$0.00	$57.22
	06/01/2025	$34.40	$9.65	$14.41	$0.00	$58.46
	12/01/2025	$35.63	$9.65	$14.41	$0.00	$59.69
	06/01/2026	$37.67	$9.65	$14.41	$0.00	$61.73
	12/01/2026	$38.96	$9.65	$14.41	$0.00	$63.02
	06/01/2027	$40.26	$9.65	$14.41	$0.00	$64.32
	12/01/2027	$41.56	$9.65	$14.41	$0.00	$65.62
	06/05/2028	$42.91	$9.65	$14.41	$0.00	$66.97
	12/04/2028	$44.26	$9.65	$14.41	$0.00	$68.32
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$34.04	$9.65	$14.53	$0.00	$58.22
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.74	$9.65	$15.60	$0.00	$59.99
	06/01/2025	$35.98	$9.65	$15.60	$0.00	$61.23
	12/01/2025	$37.21	$9.65	$15.60	$0.00	$62.46
	06/01/2026	$39.25	$9.65	$15.60	$0.00	$64.50
	12/01/2026	$40.54	$9.65	$15.60	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.04	$9.65	$14.53	$0.00	$56.22
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.04	$9.65	$14.53	$0.00	$56.22
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 4 (BUILDING & SITE)*	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.74	$9.65	$15.60	$0.00	$59.99
	06/01/2025	$35.98	$9.65	$15.60	$0.00	$61.23
	12/01/2025	$37.21	$9.65	$15.60	$0.00	$62.46
	06/01/2026	$39.25	$9.65	$15.60	$0.00	$64.50
	12/01/2026	$40.54	$9.65	$15.60	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	08/01/2024	$43.05	$11.49	$20.53	$0.00	$75.07
	02/01/2025	$44.90	$11.49	$20.53	$0.00	$76.92
	08/01/2025	$45.81	$11.49	$20.53	$0.00	$77.83
	02/01/2026	$46.89	$11.49	$20.53	$0.00	$78.91
	08/01/2026	$48.65	$11.49	$20.53	$0.00	$80.67
	02/01/2027	$49.77	$11.49	$20.53	$0.00	$81.79

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE FINISHER-Local 3 Marble/Tile (Spr/Pitt)*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.53	$11.49	$20.53	$0.00	$53.55
2	60	$25.83	$11.49	$20.53	$0.00	$57.85
3	70	$30.14	$11.49	$20.53	$0.00	$62.16
4	80	$34.44	$11.49	$20.53	$0.00	$66.46
5	90	$38.75	$11.49	$20.53	$0.00	$70.77

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.45	$11.49	$20.53	$0.00	$54.47
2	60	$26.94	$11.49	$20.53	$0.00	$58.96
3	70	$31.43	$11.49	$20.53	$0.00	$63.45
4	80	$35.92	$11.49	$20.53	$0.00	$67.94
5	90	$40.41	$11.49	$20.53	$0.00	$72.43

Notes:

Apprentice to Journeyworker Ratio:1:5

MARBLE MASON/TILE LAYER(SP/PT)SeeBrick
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE

See "BRICK/STONE/ARTIFICIAL MASONRY(INCL.MASONRY WATERPROOFING)

MECH. SWEEPER OPERATOR (ON CONST. SITES)
OPERATING ENGINEERS LOCAL 98

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANIC/WELDER/BOOM TRUCK
OPERATING ENGINEERS LOCAL 98

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 3)
MILLWRIGHTS LOCAL 1121 - Zone 3

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
01/06/2025	$43.48	$10.08	$21.22	$0.00	$74.78
01/05/2026	$45.76	$10.08	$21.22	$0.00	$77.06

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 3*

Effective Date - 01/06/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$23.91	$10.08	$5.36	$0.00	$39.35
2	65	$28.26	$10.08	$6.34	$0.00	$44.68
3	75	$32.61	$10.08	$18.78	$0.00	$61.47
4	85	$36.96	$10.08	$19.76	$0.00	$66.80

Effective Date - 01/05/2026

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$25.17	$10.08	$5.36	$0.00	$40.61
2	65	$29.74	$10.08	$6.34	$0.00	$46.16
3	75	$34.32	$10.08	$18.78	$0.00	$63.18
4	85	$38.90	$10.08	$19.76	$0.00	$68.74

Notes: Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 $5.72, Step 2 $6.66)
Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:4

MORTAR MIXER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47
For apprentice rates see "Apprentice- LABORER"						
OILER *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$35.02	$13.78	$15.15	$0.00	$63.95
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS VI *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$32.74	$13.78	$15.15	$0.00	$61.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 3*	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$29.23	$9.95	$0.00	$0.00	$39.18
2	55	$32.15	$9.95	$6.66	$0.00	$48.76
3	60	$35.08	$9.95	$7.26	$0.00	$52.29
4	65	$38.00	$9.95	$7.87	$0.00	$55.82
5	70	$40.92	$9.95	$20.32	$0.00	$71.19
6	75	$43.85	$9.95	$20.93	$0.00	$74.73
7	80	$46.77	$9.95	$21.53	$0.00	$78.25
8	90	$52.61	$9.95	$22.74	$0.00	$85.30

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 3*	01/01/2025	$41.23	$9.65	$19.90	$0.00	$70.78

Apprentice - *PAINTER Local 35 Zone 3 - Spray/Sandblast - New*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.62	$9.95	$0.00	$0.00	$30.57
2	55	$22.68	$9.95	$4.43	$0.00	$37.06
3	60	$24.74	$9.95	$4.83	$0.00	$39.52
4	65	$26.80	$9.95	$5.23	$0.00	$41.98
5	70	$28.86	$9.95	$17.49	$0.00	$56.30
6	75	$30.92	$9.95	$17.89	$0.00	$58.76
7	80	$32.98	$9.95	$18.29	$0.00	$61.22
8	90	$37.11	$9.95	$19.10	$0.00	$66.16

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 3*	01/01/2025	$38.55	$9.95	$19.90	$0.00	$68.40

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - Spray/Sandblast - Repaint*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.28	$9.95	$0.00	$0.00	$29.23
2	55	$21.20	$9.95	$4.43	$0.00	$35.58
3	60	$23.13	$9.95	$4.83	$0.00	$37.91
4	65	$25.06	$9.95	$5.23	$0.00	$40.24
5	70	$26.99	$9.95	$17.49	$0.00	$54.43
6	75	$28.91	$9.95	$17.89	$0.00	$56.75
7	80	$30.84	$9.95	$18.29	$0.00	$59.08
8	90	$34.70	$9.95	$19.10	$0.00	$63.75

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2025	$39.83	$9.95	$19.90	$0.00	$69.68

* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 3*

Apprentice - *PAINTER - Local 35 Zone 3 - BRUSH NEW*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.92	$9.95	$0.00	$0.00	$29.87
2	55	$21.91	$9.95	$4.43	$0.00	$36.29
3	60	$23.90	$9.95	$4.83	$0.00	$38.68
4	65	$25.89	$9.95	$5.23	$0.00	$41.07
5	70	$27.88	$9.95	$17.49	$0.00	$55.32
6	75	$29.87	$9.95	$17.89	$0.00	$57.71
7	80	$31.86	$9.95	$18.29	$0.00	$60.10
8	90	$35.85	$9.95	$19.10	$0.00	$64.90

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 3*	01/01/2025	$37.15	$9.95	$19.90	$0.00	$67.00

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 3 - BRUSH REPAINT*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.58	$9.95	$0.00	$0.00	$28.53
2	55	$20.43	$9.95	$4.43	$0.00	$34.81
3	60	$22.29	$9.95	$4.83	$0.00	$37.07
4	65	$24.15	$9.95	$5.23	$0.00	$39.33
5	70	$26.01	$9.95	$17.49	$0.00	$53.45
6	75	$27.86	$9.95	$17.89	$0.00	$55.70
7	80	$29.72	$9.95	$18.29	$0.00	$57.96
8	90	$33.44	$9.95	$19.10	$0.00	$62.49

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.49	$9.65	$15.60	$0.00	$59.74
	06/01/2025	$35.73	$9.65	$15.60	$0.00	$60.98
	12/01/2025	$36.96	$9.65	$15.60	$0.00	$62.21
	06/01/2026	$39.00	$9.65	$15.60	$0.00	$64.25
	12/01/2026	$40.29	$9.65	$15.60	$0.00	$65.54
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$39.78	$15.57	$20.17	$0.00	$75.52
	06/01/2025	$40.78	$15.57	$20.17	$0.00	$76.52
	12/01/2025	$40.78	$15.57	$21.78	$0.00	$78.13
	01/01/2026	$40.78	$16.17	$21.78	$0.00	$78.73
	06/01/2026	$41.78	$16.17	$21.78	$0.00	$79.73
	12/01/2026	$41.78	$16.17	$23.52	$0.00	$81.47
	01/01/2027	$41.78	$16.77	$23.52	$0.00	$82.07
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2024	$49.19	$10.08	$24.29	$0.00	$83.56
For apprentice rates see "Apprentice- PILE DRIVER"						
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 3)*	08/01/2024	$49.19	$10.08	$24.29	$0.00	$83.56

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PILE DRIVER - Local 56 Zone 3*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$22.14	$10.08	$2.53	$0.00	$34.75
2	55	$27.05	$10.08	$5.07	$0.00	$42.20
3	70	$34.43	$10.08	$19.22	$0.00	$63.73
4	80	$39.35	$10.08	$21.76	$0.00	$71.19

Notes:
% Indentured BEFORE 8/1/2020, 50/60/70/75/80/80/90/90
1$58.97/2$63.88/3$68.80/4$71.26/5&6 $73.72/7&8 $78.64

Apprentice to Journeyworker Ratio:1:5

PIPELAYER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47

For apprentice rates see "Apprentice- LABORER"

PIPELAYER (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.74	$9.65	$15.60	$0.00	$59.99
	06/01/2025	$35.98	$9.65	$15.60	$0.00	$61.23
	12/01/2025	$37.21	$9.65	$15.60	$0.00	$62.46
	06/01/2026	$39.25	$9.65	$15.60	$0.00	$64.50
	12/01/2026	$40.54	$9.65	$15.60	$0.00	$65.79

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

PLUMBER & PIPEFITTER *PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86

Apprentice - *PLUMBER/PIPEFITTER - Local 104 Western*

Effective Date - 03/17/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$22.14	$9.55	$10.10	$0.00	$41.79
2	50	$24.61	$9.55	$10.10	$0.00	$44.26
3	55	$27.07	$9.55	$10.10	$0.00	$46.72
4	60	$29.53	$9.55	$10.10	$0.00	$49.18
5	65	$31.99	$9.55	$10.10	$0.00	$51.64
6	70	$34.45	$9.55	$10.10	$0.00	$54.10
7	75	$36.91	$9.55	$10.10	$0.00	$56.56
8	80	$39.37	$9.55	$10.10	$0.00	$59.02
9	80	$39.37	$9.55	$17.10	$0.00	$66.02
10	80	$39.37	$9.55	$17.10	$0.00	$66.02

Notes: **1:1,2:5,3:9,4:12

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.74	$9.65	$15.60	$0.00	$59.99
	06/01/2025	$35.98	$9.65	$15.60	$0.00	$61.23
	12/01/2025	$37.21	$9.65	$15.60	$0.00	$62.46
	06/01/2026	$39.25	$9.65	$15.60	$0.00	$64.50
	12/01/2026	$40.54	$9.65	$15.60	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
POWDERMAN & BLASTER *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$33.04	$9.65	$14.53	$0.00	$57.22
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$35.90	$9.65	$15.19	$0.00	$60.74
	06/01/2025	$37.14	$9.65	$15.19	$0.00	$61.98
	12/01/2025	$38.37	$9.65	$15.19	$0.00	$63.21
	06/01/2026	$40.41	$9.65	$15.19	$0.00	$65.25
	12/01/2026	$41.70	$9.65	$15.19	$0.00	$66.54
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.56	$13.78	$15.15	$0.00	$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS 404 - Construction Service (Northampton)*	05/01/2024	$26.14	$11.82	$7.25	$0.00	$45.21
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 4 (BUILDING & SITE)*	12/01/2024	$32.29	$9.65	$14.53	$0.00	$56.47
For apprentice rates see "Apprentice- LABORER"						
ROLLER OPERATOR *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$38.42	$13.78	$15.15	$0.00	$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Coal tar pitch) *ROOFERS LOCAL 248*	10/02/2024	$42.38	$10.35	$18.00	$0.00	$70.73
	07/16/2025	$43.88	$10.35	$18.00	$0.00	$72.23
	10/02/2025	$44.88	$10.35	$18.00	$0.00	$73.23
	07/16/2026	$46.88	$10.35	$18.00	$0.00	$75.23
For apprentice rates see "Apprentice- ROOFER"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 248*	10/02/2024	$41.88	$10.35	$18.00	$0.00	$70.23
	07/16/2025	$43.38	$10.35	$18.00	$0.00	$71.73
	10/02/2025	$44.38	$10.35	$18.00	$0.00	$72.73
	07/16/2026	$46.38	$10.35	$18.00	$0.00	$74.73

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 248*

Effective Date - 10/02/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.13	$10.35	$0.00	$0.00	$35.48
2	65	$27.22	$10.35	$18.00	$0.00	$55.57
3	70	$29.32	$10.35	$18.00	$0.00	$57.67
4	75	$31.41	$10.35	$18.00	$0.00	$59.76
5	80	$33.50	$10.35	$18.00	$0.00	$61.85
6	85	$35.60	$10.35	$18.00	$0.00	$63.95
7	90	$37.69	$10.35	$18.00	$0.00	$66.04
8	95	$39.79	$10.35	$18.00	$0.00	$68.14

Notes:

Steps are 750 hrs.Roofer(Tear Off)1:1; Same as above

Apprentice to Journeyworker Ratio:1:3

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 248*	10/02/2024	$42.38	$10.35	$18.00	$0.00	$70.73
	07/16/2025	$43.88	$10.35	$18.00	$0.00	$72.23
	10/02/2025	$44.88	$10.35	$18.00	$0.00	$73.23
	07/16/2026	$46.88	$10.35	$18.00	$0.00	$75.23
For apprentice rates see "Apprentice- ROOFER"						
SCRAPER *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$39.03	$13.78	$15.15	$0.00	$67.96
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SELF-POWERED ROLLERS AND COMPACTORS (TAMPERS) *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$38.42	$13.78	$15.15	$0.00	$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SELF-PROPELLED POWER BROOM *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$35.80	$13.78	$15.15	$0.00	$64.73
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 63*	01/01/2025	$42.23	$12.20	$18.74	$2.13	$75.30

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 63*

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$19.00	$5.49	$4.86	$0.85	$30.20
2	50	$21.12	$6.10	$5.40	$0.94	$33.56
3	55	$23.23	$6.71	$9.71	$1.15	$40.80
4	60	$25.34	$7.32	$9.71	$1.23	$43.60
5	65	$27.45	$7.93	$9.71	$1.31	$46.40
6	70	$29.56	$8.54	$9.71	$1.39	$49.20
7	75	$31.67	$9.15	$9.71	$1.47	$52.00
8	80	$33.78	$9.76	$17.66	$1.78	$62.98
9	85	$35.90	$10.37	$17.66	$1.86	$65.79
10	90	$38.01	$10.98	$17.66	$1.94	$68.59

Notes:

Apprentice to Journeyworker Ratio:1:3

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$40.24	$15.57	$20.17	$0.00	$75.98
	06/01/2025	$41.24	$15.57	$20.17	$0.00	$76.98
	12/01/2025	$41.24	$15.57	$21.78	$0.00	$78.59
	01/01/2026	$41.24	$16.17	$21.78	$0.00	$79.19
	06/01/2026	$42.24	$16.17	$21.78	$0.00	$80.19
	12/01/2026	$42.24	$16.17	$23.52	$0.00	$81.93
	01/01/2027	$42.24	$16.77	$23.52	$0.00	$82.53
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$40.53	$15.57	$20.17	$0.00	$76.27
	06/01/2025	$41.53	$15.57	$20.17	$0.00	$77.27
	12/01/2025	$41.53	$15.57	$21.78	$0.00	$78.88
	01/01/2026	$41.53	$16.17	$21.78	$0.00	$79.48
	06/01/2026	$42.53	$16.17	$21.78	$0.00	$80.48
	12/01/2026	$42.53	$16.17	$23.52	$0.00	$82.22
	01/01/2027	$42.53	$16.77	$23.52	$0.00	$82.82
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 669*	04/01/2023	$47.43	$11.45	$16.61	$0.00	$75.49

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 669*

Effective Date - 04/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$21.34	$8.22	$0.00	$0.00	$29.56
2	50	$23.72	$8.22	$0.00	$0.00	$31.94
3	55	$26.09	$11.45	$7.20	$0.00	$44.74
4	60	$28.46	$11.45	$8.35	$0.00	$48.26
5	65	$30.83	$11.45	$8.35	$0.00	$50.63
6	70	$33.20	$11.45	$8.60	$0.00	$53.25
7	75	$35.57	$11.45	$8.60	$0.00	$55.62
8	80	$37.94	$11.45	$8.60	$0.00	$57.99
9	85	$40.32	$11.45	$8.60	$0.00	$60.37
10	90	$42.69	$11.45	$8.60	$0.00	$62.74

Notes:

Apprentice to Journeyworker Ratio:1:1

TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 7*	12/29/2024	$51.06	$13.25	$15.06	$0.00	$79.37
	06/29/2025	$52.16	$13.50	$15.21	$0.00	$80.87
	12/28/2025	$53.26	$13.75	$15.36	$0.00	$82.37
	06/28/2026	$54.41	$14.00	$15.46	$0.00	$83.87
	01/03/2027	$55.56	$14.25	$15.56	$0.00	$85.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 7*

Effective Date - 12/29/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.42	$7.35	$0.61	$0.00	$28.38
2	45	$22.98	$7.35	$0.69	$0.00	$31.02
3	50	$25.53	$13.25	$7.47	$0.00	$46.25
4	55	$28.08	$13.25	$7.54	$0.00	$48.87
5	65	$33.19	$13.25	$9.74	$0.00	$56.18
6	70	$35.74	$13.25	$11.19	$0.00	$60.18

Effective Date - 06/29/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$20.86	$7.50	$0.63	$0.00	$28.99
2	45	$23.47	$7.50	$0.70	$0.00	$31.67
3	50	$26.08	$13.50	$7.53	$0.00	$47.11
4	55	$28.69	$13.50	$7.61	$0.00	$49.80
5	65	$33.90	$13.50	$9.84	$0.00	$57.24
6	70	$36.51	$13.50	$11.30	$0.00	$61.31

Notes:
Steps are 800 hours

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	08/01/2024	$63.44	$11.49	$23.59	$0.00	$98.52
	02/01/2025	$64.74	$11.49	$23.59	$0.00	$99.82
	08/01/2025	$66.89	$11.49	$23.59	$0.00	$101.97
	02/10/2026	$68.24	$11.49	$23.59	$0.00	$103.32
	08/01/2026	$70.44	$11.49	$23.59	$0.00	$105.52
	02/01/2027	$71.84	$11.49	$23.59	$0.00	$106.92

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER-Local 3 Marble/Tile (Spr/Ptt)*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.72	$11.49	$23.59	$0.00	$66.80
2	60	$38.06	$11.49	$23.59	$0.00	$73.14
3	70	$44.41	$11.49	$23.59	$0.00	$79.49
4	80	$50.75	$11.49	$23.59	$0.00	$85.83
5	90	$57.10	$11.49	$23.59	$0.00	$92.18

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.37	$11.49	$23.59	$0.00	$67.45
2	60	$38.84	$11.49	$23.59	$0.00	$73.92
3	70	$45.32	$11.49	$23.59	$0.00	$80.40
4	80	$51.79	$11.49	$23.59	$0.00	$86.87
5	90	$58.27	$11.49	$23.59	$0.00	$93.35

Notes:

Apprentice to Journeyworker Ratio:1:5

TERRAZZO MECHANIC *BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE*	08/01/2024	$64.52	$11.49	$23.56	$0.00	$99.57
	02/01/2025	$65.82	$11.49	$23.56	$0.00	$100.87
	08/01/2025	$67.97	$11.49	$23.56	$0.00	$103.02
	02/01/2026	$69.32	$11.49	$23.56	$0.00	$104.37
	08/01/2026	$71.52	$11.49	$23.56	$0.00	$106.57
	02/01/2027	$72.92	$11.49	$23.56	$0.00	$107.97

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO MECH - Local 3 Marble/Tile (Spr/Pitt)*

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.26	$11.49	$23.56	$0.00	$67.31
2	60	$38.71	$11.49	$23.56	$0.00	$73.76
3	70	$45.16	$11.49	$23.56	$0.00	$80.21
4	80	$51.62	$11.49	$23.56	$0.00	$86.67
5	90	$58.07	$11.49	$23.56	$0.00	$93.12

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.91	$11.49	$23.56	$0.00	$67.96
2	60	$39.49	$11.49	$23.56	$0.00	$74.54
3	70	$46.07	$11.49	$23.56	$0.00	$81.12
4	80	$52.66	$11.49	$23.56	$0.00	$87.71
5	90	$59.24	$11.49	$23.56	$0.00	$94.29

Notes:

Apprentice to Journeyworker Ratio:1:5

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	12/01/2024	$51.28	$9.65	$18.22	$0.00	$79.15
	06/01/2025	$52.78	$9.65	$18.22	$0.00	$80.65
	12/01/2025	$54.28	$9.65	$18.22	$0.00	$82.15
	06/01/2026	$55.83	$9.65	$18.22	$0.00	$83.70
	12/01/2026	$57.33	$9.65	$18.22	$0.00	$85.20
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	12/01/2024	$47.07	$9.65	$18.22	$0.00	$74.94
	06/01/2025	$48.57	$9.65	$18.22	$0.00	$76.44
	12/01/2025	$50.07	$9.65	$18.22	$0.00	$77.94
	06/01/2026	$51.62	$9.65	$18.22	$0.00	$79.49
	12/01/2026	$53.12	$9.65	$18.22	$0.00	$80.99
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2024	$46.95	$9.65	$18.22	$0.00	$74.82
	06/01/2025	$48.45	$9.65	$18.22	$0.00	$76.32
	12/01/2025	$49.95	$9.65	$18.22	$0.00	$77.82
	06/01/2026	$51.50	$9.65	$18.22	$0.00	$79.37
	12/01/2026	$53.00	$9.65	$18.22	$0.00	$80.87
For apprentice rates see "Apprentice- LABORER"						
TRACTORS *OPERATING ENGINEERS LOCAL 98*	12/01/2023	$38.42	$13.78	$15.15	$0.00	$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$40.82	$15.57	$20.17	$0.00	$76.56
	06/01/2025	$41.82	$15.57	$20.17	$0.00	$77.56
	12/01/2025	$41.82	$15.57	$21.78	$0.00	$79.17
	01/01/2026	$41.82	$16.17	$21.78	$0.00	$79.77
	06/01/2026	$42.82	$16.17	$21.78	$0.00	$80.77
	12/01/2026	$42.82	$16.17	$23.52	$0.00	$82.51
	01/01/2027	$42.82	$16.77	$23.52	$0.00	$83.11
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	12/01/2024	$59.18	$9.65	$19.00	$0.00	$87.83
	06/01/2025	$60.68	$9.65	$19.00	$0.00	$89.33
	12/01/2025	$62.18	$9.65	$19.00	$0.00	$90.83
	06/01/2026	$63.73	$9.65	$19.00	$0.00	$92.38
	12/01/2026	$65.23	$9.65	$19.00	$0.00	$93.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	12/01/2024	$61.18	$9.65	$19.00	$0.00	$89.83
	06/01/2025	$62.68	$9.65	$19.00	$0.00	$91.33
	12/01/2025	$64.18	$9.65	$19.00	$0.00	$92.83
	06/01/2026	$65.73	$9.65	$19.00	$0.00	$94.38
	12/01/2026	$67.23	$9.65	$19.00	$0.00	$95.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	12/01/2024	$51.25	$9.65	$19.00	$0.00	$79.90
	06/01/2025	$52.75	$9.65	$19.00	$0.00	$81.40
	12/01/2025	$54.25	$9.65	$19.00	$0.00	$82.90
	06/01/2026	$55.80	$9.65	$19.00	$0.00	$84.45
	12/01/2026	$57.30	$9.65	$19.00	$0.00	$85.95
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	12/01/2024	$53.25	$9.65	$19.00	$0.00	$81.90
	06/01/2025	$54.75	$9.65	$19.00	$0.00	$83.40
	12/01/2025	$56.25	$9.65	$19.00	$0.00	$84.90
	06/01/2026	$57.80	$9.65	$19.00	$0.00	$86.45
	12/01/2026	$59.30	$9.65	$19.00	$0.00	$87.95
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	01/01/2025	$40.24	$15.57	$20.17	$0.00	$75.98
	06/01/2025	$41.24	$15.57	$20.17	$0.00	$76.98
	12/01/2025	$41.24	$15.57	$21.78	$0.00	$78.59
	01/01/2026	$41.24	$16.17	$21.78	$0.00	$79.19
	06/01/2026	$42.24	$16.17	$21.78	$0.00	$80.19
	12/01/2026	$42.24	$16.17	$23.52	$0.00	$81.93
	01/01/2027	$42.24	$16.77	$23.52	$0.00	$82.53
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 4 (HEAVY & HIGHWAY)*	12/01/2024	$34.74	$9.65	$15.60	$0.00	$59.99
	06/01/2025	$35.98	$9.65	$15.60	$0.00	$61.23
	12/01/2025	$37.21	$9.65	$15.60	$0.00	$62.46
	06/01/2026	$39.25	$9.65	$15.60	$0.00	$64.50
	12/01/2026	$40.54	$9.65	$15.60	$0.00	$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WATER METER INSTALLER *PLUMBERS & PIPEFITTERS LOCAL 104 WESTERN DIVISION*	03/17/2024	$49.21	$9.55	$17.10	$0.00	$75.86
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Additional Apprentice Information:

All apprentices must be registered with the Division of Apprenticeship Training (DAS) in accordance with M.G.L. c. 23, §§ 11E-11L. Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the hourly prevailing wage rate established by the Commissioner under the provisions of M.G.L. c. 149, §§ 26-27D. Apprentice ratios are established by DAS pursuant to M.G.L. c. 23, §§ 11E-11L. Ratios are expressed as the allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified. The ratios listed herein have been taken from relevant private collective bargaining agreements (CBAs) and are provided for illustrative purposes only. They have not been independently verified as being accurate or continuing to be accurate. Parties having questions regarding what ratio to use should contact DAS.