

**TOWN OF AYER**  
**REQUEST FOR PROPOSALS**  
**FOR**  
**PRE-ENGINEERED GARAGE AT GROVE POND WATER**  
**TREATMENT PLANT**



**TOWN OF AYER**  
**DEPARTMENT OF PUBLIC WORKS**  
**25 BROOK STREET**  
**AYER, MA 01432**

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**TOWN OF AYER**  
**PRE-ENGINEERED GARAGE AT GROVE POND WATER TREATMENT PLANT**  
**REQUEST FOR PROPOSALS**

**Part 1 - General Information**

The project consists of design, prefabrication, site assembly/installation of a 60-ft by 35-ft garage to be used for parking and storage of Ayer Water Department vehicles and equipment. The garage will be located at the existing Grove Pond Water Treatment Plant off Barnum Road in Ayer.

**1.1 General**

Pursuant to M.G.L. c. 149, § 44E(4), the Town of Ayer Department of Public Works (DPW) requests proposals from qualified contractors for the design, prefabrication, site assembly/installation and all services required to complete and deliver one pre-engineered garage ready for use and occupancy. All proposals are to be submitted no later than the deadline stated in Part 2, "Proposal Submission Requirements," and the non-price proposals will be opened at that time. Every proposal must be in two parts, submitted in two separate, clearly marked, sealed envelopes: 1) non-price proposal, and 2) price proposal, in accordance with all submission requirements set forth in Part 2 of this RFP. Late proposals will not be accepted.

**1.2 Obtaining Proposal Documents**

Proposal documents may be obtained at no charge online at [ayer.ma.us](http://ayer.ma.us). A link to the documents will be available on the home page ([ayer.ma.us](http://ayer.ma.us)), under "General Announcements". Additionally, documents can be obtained by contacting Dan Van Schalkwyk, Town Engineer at [dvanschalkwyk@ayer.ma.us](mailto:dvanschalkwyk@ayer.ma.us), 978-772-8240, or made available in the DPW office. Contract documents obtained in person will require a deposit of \$50 in cash or check, payable to Town of Ayer, for each set. A refund of the deposit will be made only for Documents returned in good condition within 30 calendar days after the Bids are received. Bidders will be furnished one set of Contract Documents for the deposit specified. Additional sets may be purchased at the above price. No deposit refund will be given for the return of additional sets.

**1.3 Questions**

Please contact Daniel Van Schalkwyk with any questions prior to Friday July 22, 2016 at 1:00 PM. A response to each question will be provided to all vendors and will also be posted online through the Town of Ayer's website no later than two days prior to the proposal deadline.

**1.4 List of Proposers & Addenda**

Proposers are urged to contact Dan Van Schalkwyk to get on the request for proposals list. If any changes are made to this Request for Proposals, an addendum will be issued. Addenda will be mailed, e-mailed or faxed to all bidders on record as having received the Request for Proposals as well as updated on the Town's website. Proposers should confirm and acknowledge if there are any RFP updates prior to submitting their proposal. Proposers should acknowledge the receipt of all addenda on their price proposal form.

**1.5 Pre-Submission Briefing Session**

Firms intending on submitting formal qualifications are highly encouraged to attend a Pre-Submission Briefing Session on Wednesday July 13, 2016 at 10:30 a.m. The briefing will be conducted at the Grove Pond Water Treatment Plant located on Barnum Road.

## **1.6 Proposals Subject to Contract Terms**

Each proposal submitted in response to this RFP is subject to all of the contract terms set forth in Part 5, "Contract Terms," and any contract awarded will incorporate all of these contract terms.

## **1.7 Definition of Responsive Proposal and Responsible Contractor**

The Town of Ayer DPW will consider only responsive proposals from responsible contractors for a contract award. A responsive proposal is a proposal that complies with requirements stated in Part 2 and Part 3 of this Request for Proposals (RFP). A responsible contractor is a contractor that demonstrably possesses the skill, ability and integrity necessary to faithfully perform the work called for in this procurement.

## **1.8 Evaluation Criteria Summary**

Each responsive proposal from a responsible contractor will be evaluated solely according to the criteria set forth in Part 4 of this RFP, "Evaluation Criteria." Each non-price proposal will be assigned a rating of *highly advantageous*, *advantageous*, *not advantageous* or *unacceptable* with respect to each criterion, and the reasons for each rating will be set forth in writing. A composite rating for each non-price proposal will be set forth in writing, along with the reasons for the rating. The Town of Ayer DPW will determine the most advantageous proposal from a responsible and responsive offeror, taking into consideration the non-price proposal ratings and proposal price. If the contract is awarded to an offeror that did not submit the lowest price, the Town of Ayer DPW will set forth a written explanation of the reasons for the award.

## **1.9 Preference to Massachusetts Manufacturing**

In determining the most advantageous proposal, The Town of Ayer DPW shall give preference, other considerations being equal, first to pre-engineered buildings manufactured within Massachusetts, and second to pre-engineered buildings manufactured outside of Massachusetts but within the United States.

## **1.10 Opening of Proposals**

Proposals will not be opened publicly, but will be opened in the presence of one or more witnesses at the time stated below. The contents of proposals shall remain confidential, and shall not be disclosed to competing offerors until the completion of the evaluation or until the maximum time for acceptance, as stated below. At the opening of proposals, the Town of Ayer DPW shall prepare a register of proposals for public inspection.

## **1.11 Withdrawal or Changes to Proposal**

An offeror may correct, modify or withdraw a proposal by written notice received in the office designated herein for proposal submission prior to the time set for the opening of proposals. After the opening, a contractor may not change the price or any other provision of the proposal in a manner prejudicial to the interest of the Town of Ayer DPW or to fair competition. The Town of Ayer DPW shall waive minor informalities or allow the offeror to correct them. If a mistake and the intended offer are clearly evident on the face of the document, the Town of Ayer DPW shall correct the mistake to reflect the intended correct offer and so notify the offeror in writing, and the offeror may not withdraw the offer. The Town of Ayer DPW may permit an offeror to withdraw an offer if a mistake is evident on the face of the document but the intended correct offer is not similarly evident.

## **1.12 Right to Cancel Request for Proposal**

The Town of Ayer DPW reserves the right to cancel this procurement at any time before a contract is executed and approved, in which event will reject all proposals received in response to this RFP.

### **1.13 Award**

The Town of Ayer DPW shall award a contract by written notice to the selected offeror by no later than Wednesday August 10, 2016 unless the time for contract award is extended by mutual agreement between the Town of Ayer DPW and the selected offeror.

### **1.14 Schedule**

The contractor's performance under the contract must be completed within 120 days from the date of notification to proceed.

### **1.15 Prevailing Wage Requirement**

The selected proposer is required to pay Massachusetts Prevailing Wage for all work performed at the building site. The Prevailing Wages to be used for this project are incorporated as **Appendix A**.

## **Part 2 - Proposal Submission Requirements**

Two (2) complete copies of the non-price and price proposals are to be delivered to the Town of Ayer DPW located at 25 Brook Street, no later than 1:00 P.M. on Friday July 29, 2016. Non-price proposals will be opened at that time. The Town of Ayer DPW will select a contractor no later than Wednesday August 10, 2016. **Late proposals will not be accepted.**

All offerors are encouraged to visit the site before submitting a proposal. Submission of a proposal constitutes an acknowledgement that the offeror has examined the site and is familiar with existing conditions.

Every proposal must be in two parts, submitted in separate, clearly marked, sealed envelopes: 1) non-price proposal; and 2) price proposal.

The following information must appear on each envelope:

Contractor's Name:

Project Name:

Either "Non-Price Submission" or "Price Submission"

### **2.1 Non-Price Proposal Required Documents**

The non-price proposal must consist of the following documents:

1. Non-Price Proposal Form signed and submitted.
2. Current Certificate of Eligibility for Pre-engineered Construction/Prefab or General Building Construction.
3. Completed Contractor Update Statement.
4. Certification by the State Board of Building Regulations and Standards that the manufacturer of the pre-engineered buildings meets state building code requirements.
5. A set of detailed plans and specifications for the proposed pre-engineered buildings. Proposals must include all manufacturers' specifications governing the materials and equipment used in the pre-engineered building. The plans submitted with each proposal must provide all drawings necessary to portray to the Town of Ayer DPW all pertinent design details of the pre-engineered buildings, including:
  - a. an installation plan showing the proposed accurate location of the pre-engineered building on the property; an indication of the location on the pre-engineered building at which utility service connections are proposed; and locations of existing utility services to which the proposed pre-engineered building can be connected.
  - b. mounting plans and details.
  - c. architectural type floor plans.
  - d. factory plans and details of passageway elements and entrance ramps.
  - e. factory plans and details of manufacture of structural elements including floors, walls, and roof.
  - f. factory plans and details of service appurtenances including electrical, plumbing, and HVAC. Such details must include all light fixtures, outlets, switches, controls, smoke

- detectors, and location and capacity/rating of all equipment, fixtures, and appliances.
  - g. factory details of windows and doors.
  - h. factory finish details for wall finishes, floor finishes, exterior skin finish, and trim.
6. The complete terms of all warranties provided by the manufacturer or by the offeror relative to the design, manufacture, and installation of the pre-engineered buildings, including both general warranties and special warranties associated with particular components and equipment.
  7. Certification of state tax laws, reporting of employees and contractors, and withholding and remitting of child support, as required by M.G.L. c. 62C, § 49A and of non-collusion, signed and submitted.
  8. Certification that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least ten hours in duration at the time the employee begins work and shall furnish documentation of successful completion of such course with the first certified payroll report for each employee, signed and submitted.
  9. Certification that the proposed pre-engineered buildings will be either (1) manufactured within Massachusetts; or (2) manufactured outside of Massachusetts but within the United States, or (3) manufactured outside of the United States, signed and submitted.
  10. Certification that the proposed pre-engineered building plans comply with all Building Codes, including the Stretch Building Code, and will meet the regulations and requirements of the Commonwealth's Manufactured Building Program, signed and submitted.

The following forms to be submitted with Proposer's response are found in **Appendix B**:

- Non-Price Proposal Form
- Past Performance / Reference Form
- Certificate of Non-Collusion & Tax Compliance
- Certificate of Signature Authority
- Prevailing Wage Compliance Form
- Sub-Vendor/Sub-Contractor Form
- DCAMM Certificate of Eligibility for Pre-engineered Construction/Prefabrication or General Construction and Update Statement
- OSHA Certification Form

Submissions to be provided post award

- Insurance Certificate: As outlined on attached form included in this solicitation, must be provided by the **awarded vendor** within ten (10) business days of Notice of Award.
- Contact names, phone numbers and e-mail addresses are required by the Town of Ayer.
- Vendor TIN Certification (W-9)

## **2.2 Price Proposal Required Documents**

The price proposal must consist of the following documents:

1. A firm, fixed price that includes the furnishing of all materials, services, labor, performance and payment bonds, insurance and other costs incurred in the performance of the contract, signed by an individual authorized to bind the offeror contractually, and submitted on the Price Proposal



Form.

2. The Bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond on the form attached issued by a surety meeting the requirements of the General Conditions.

All Bid Securities except those of the three most advantageous bidders, as determined by review by the Town of Ayer, will be returned within five days, Saturdays, Sundays, and legal holidays excluded, after opening of the General Bids. The Bid security of the three most advantageous bidders will be retained until the Successful Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited to the OWNER as liquidated damage. The amount forfeited to OWNER shall not exceed the difference between the Bid Price of said Bidder and that of the next lowest responsible and eligible bidder and provided further that, in case of death, disability, or other unforeseen circumstances affecting the Bidder, such Bid Security may be returned to the Bidder.

All Bid Securities will be returned on the execution of the Agreement or if no award is made within sixty (60) days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Generals Bids, unless forfeited under the conditions herein stipulated.

Please note bid alternatives are included in the Price Proposal Form.

The following forms are found in **Appendix C**:

Required Submissions (included with response)

- Price Proposal Form
- Bid Bond Form

### **Part 3 - Specifications/Scope of Services**

Pursuant to M.G.L. c. 149, §44E(4), the Town of Ayer, as the Awarding Authority, requests proposals from qualified contractors for the pre-engineered building project outlined in this RFP at the Grove Pond Water Treatment Plant, located on Barnum Road. The Project consists of all services required to complete and deliver the design, prefabrication, site assembly and/or installation of a pre-engineered garage. The pre-engineered structure will meet the following characteristics.

Schematic plans and specifications are included as **Appendices D and E**, respectively. The purpose of the schematic plans and specifications is to allow the proposer to prepare a design based on the desired scope. A summary of the major design and building components is included below:

- Approx. 60-FT x 35-FT
- One-story
- Two-access doors
- Two-bay garage
- Heating/Ventilation
- Single-slope roof
- Electrical service, outlets and lighting

**Subsurface Data:** A subsurface exploration program consisting of one boring and two test pits has been performed with reasonable care. The results of the exploration program are included as **Appendix F** and are a part of the Contract Documents. If Contractors deem the subsurface information insufficient, they may, after obtaining Owner's permission, carry out additional subsurface explorations, at no expense to the Owner.

Subsurface information provided in the Contract Documents is limited by the methods used for obtaining and expressing such data, and is subject to various interpretations. The terms used to describe soils, rock, groundwater and such other conditions are subject to local usage and individual interpretation.

Subsurface exploration, soil and rock data are for the general information of the Contractors. The Contractors are obligated to examine the site, review boring and test pit logs, all available information and records of explorations, investigations and other pertinent data for the site, and then based upon their own interpretations and investigations decide the character of material to be encountered and excavated, the suitability of the materials to be used for backfilling and such other purposes if allowed by the contract documents, the groundwater conditions, difficulties or obstacles likely to be encountered, and other conditions affecting the work. The subsurface data is accurate only at the particular locations and times the subsurface explorations were made. No other warranty either expressed or implied by the Owner, Engineer or their agents is made as to the accuracy of the subsurface information and data shown on the drawings or presented in the Contract Documents.

**Preparation of Site:** The contractor shall be responsible for the preparation of the site for construction of the foundation, including excavation.

**Site work:** The contractor is responsible for excavation, construction of the foundation, back-fill to the foundation, installation of on-site drainage, and preparation of the lot required for delivery of the pre-engineered garage to be assembled. The contractor is responsible for the placement of the pre-engineered structure on the building foundation at the site, including the provisioning of a crane and

any required police details.

The contractor is responsible for the provision and expense of temporary power and sanitary facilities. The contractor must complete the connection of electric services to the structure and installation of heating and ventilation system components.

The contractor shall be responsible for repaving any disturbed areas and matching to existing pavement.

The contractor's responsibilities will include all of the following:

1. Design and fabrication of pre-engineered units in accordance with all specifications set forth in this RFP and all program requirements and applicable building codes.
2. Site design in accordance with all specifications set forth in this RFP and all program requirements and applicable building codes.
3. All site clearance and site preparation work, including grading, tree and stump removal, and relocation of power lines and underground utilities, if required.
4. All excavation work and construction of foundations in accordance with the plans and specifications set forth in this RFP.
5. Provision and expense of all temporary utility and sanitary facilities at the project site.
6. Costs of any police details required for the completion of the scope of work.
7. Delivery of all pre-engineered units and construction materials to the construction site.
8. Acquisition of all permits required for the transportation of pre-engineered units from the factory to the construction site. Town will waive all Town Permit Fees.
9. Acquisition of all required building permits.
10. Acquisition of all required environmental permits.
11. Acquisition of all required trench/construction permits.
12. Construction of cast-in-place concrete foundation.
13. Complete installation and assembly of pre-engineered units in accordance with all plans and specifications set forth in this RFP and all applicable building codes.
14. Connection of all electrical service in accordance with the plans and specifications set forth in this RFP.
15. Acquisition of all use and occupancy permits.
16. Finish grading and removal of all debris from the site.
17. Meeting federal, state, and/or local regulations regarding Health and Safety requirements.
18. All repairs and corrective work required by applicable warranties.

Specifications should be prepared with close attention to the RFP requirements and state building code requirements for:

1. Foundations, or concrete footings, anchoring and skirting.
2. Exterior stairs, entrance ramps and corridors.
3. Floors: joists, bottom board, insulation, subflooring, weight load capacity and floor coverings.
4. Walls: studs, insulation, composition, siding, weight load capacity, wind load capacity, ceiling height, sound proofing and interior finishes.

5. Roof: composition, sheathing, framing, weight load capacity, pitch, insulation, eaves and downspouts and ceiling materials.
6. Doors: number, size, construction of frames, materials, weatherstripping, and lockset and hardware details.
7. Windows: number, size, construction of frames, glazing, weatherstripping, screens, and lock and hardware details.
8. HVAC systems: functional requirements for and description of heating, ventilation and cooling systems.
9. Plumbing: requirements for supply, waste, and vent lines, and fittings; size, type, and capacity of water heaters; and description of plumbing fixture requirements, including sinks, water closets and water fountains.
10. Electrical systems: service requirements, capacity and outlets.
11. Lighting: illumination requirements and type of fixtures.

## Part 4 - Evaluation Criteria

Non-price proposals that meet all of the submission requirements in this RFP will be evaluated and rated solely on the basis of the evaluation criteria contained in this section. Each responsive non-price proposal will be assigned a rating for the evaluation criteria in this Part.

Comparative Evaluation Criteria will be applied uniformly to all proposals. Each criterion shall be rated as follows:

- **Highly Advantageous** - submission excels on the specific criterion
- **Advantageous** - submission meets evaluation standard for the criterion
- **Not Advantageous** - submission does not fully meet the evaluation criterion or leaves a question or issue not fully addressed
- **Unacceptable** - submission does not address the elements of this criterion

Each responsive non-price proposal will be assigned a rating for each of the following specific criteria:

**1. Does the proposal meet the requirements for performance and materials set forth in the Technical Specifications?**

Highly Advantageous: Exceeds the requirements; indicates that performance and materials will be better than the minimum required by the RFP.

Advantageous: Clearly and unambiguously meets the requirements.

Not Advantageous: Will meet the requirements with minor revisions.

Unacceptable: Will require significant revisions to meet the requirements.

**2. Does the proposal meet the layout requirements set forth in the Drawings?**

Highly Advantageous: Exceeds the requirements; improves on the layout depicted in the RFP drawings.

Advantageous: Clearly and unambiguously meets the requirements.

Not Advantageous: Will meet the requirements with minor revisions.

Unacceptable: Will require significant revisions to meet the requirements.

**3. Is the proposal clear; is the intent of the Applicant clearly presented?**

Highly Advantageous: Proposal is of outstanding quality.

Advantageous: Proposal is clear and unambiguous.

Not Advantageous: Proposal is somewhat unclear and ambiguous, but the items in question are not substantive.

Unacceptable: Proposal is unclear on significant issues.

**4. Prior Similar Experience.**

Highly Advantageous: if more than five (5) similar projects have been completed satisfactorily within the last three (3) years.

Advantageous: if three (3) to five (5) similar projects have been completed satisfactorily in the last three (3) years.

Not Advantageous: if fewer than three (3) similar projects have been completed satisfactorily in the last three (3) years.

Unacceptable: if no similar projects have been completed satisfactorily in the last three (3) years.

**5. Schedule: See the timeline for substantial completion and final completion in Section 1.14**

Highly Advantageous: for the proposal that provides that the guaranteed date by which a Certificate of Occupancy will be secured, will be 30 days prior to the required date of Certificate of Occupancy.

Advantageous: for the proposal that provides that the guaranteed date by which a Certificate of Occupancy will be secured, will be the required date of Certificate of Occupancy.

Unacceptable: for the proposal that provides that the Certificate of Occupancy will not be secured by the required date of Certificate of Occupancy.

**6. References: Based on reference checks and/or clearly accessible documentation of past performance.**

Highly Advantageous: if more than five (5) references are from similar projects successfully completed in Massachusetts with the past five (5) years.

Advantageous: if three (3) to five (5) references are from similar projects successfully completed in Massachusetts within the past five (5) years.

Not Advantageous: if fewer than three (3) references are from similar projects successfully completed in Massachusetts within the past five (5) years.

Unacceptable: if no references are from similar projects successfully completed in Massachusetts within the past five (5) years.

In evaluating each non-price proposal, the Town of Ayer DPW shall assign a rating of *highly advantageous*, *advantageous*, *not advantageous* or *unacceptable* for each of the criteria. The Town of Ayer DPW may identify any revisions necessary to change a rating on a criterion from *unacceptable* to *advantageous* and shall specify such changes in writing.

The Town of Ayer DPW shall assign a composite rating of *highly advantageous*, *advantageous*, *not advantageous* or *unacceptable* for each non-price proposal. Each composite rating shall be justified in writing. After a composite rating has been assigned for each proposal on the basis of the evaluation criteria in this section, the Town of Ayer DPW shall review the price proposals and determine the most advantageous proposal, taking into consideration the non-price proposal ratings and the price. If the Town of Ayer DPW selects a proposal other than the lowest-priced proposal, the Town of Ayer DPW shall explain in writing why the added benefits of the proposal justify its higher price. The award of a contract to any offeror whose non-price proposal was rated *unacceptable* with respect to one or more criteria will be conditioned on the negotiation of the revisions recommended by the Town of Ayer DPW at no increase in the proposed price.

## **Part 5 - Contract Terms**

Any contract awarded on the basis of this RFP will be subject to the contract terms as found in the specifications.

# Appendix A

## Prevailing Wage Rates







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

**Prevailing Wage Rates**

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

RONALD L. WALKER, II  
Secretary

WILLIAM D MCKINNEY  
Director

CHARLES D. BAKER  
Governor

KARYN E. POLITO  
Lt. Governor

**Awarding Authority:** Town of Ayer  
**Contract Number:** **City/Town:** AYER  
**Description of Work:** Modular Construction of garage pursuant to M.G.L. c. 149, § 44E(4): design, prefabrication, site assembly/installation and all services required to complete and deliver one pre-engineered garage.  
**Job Location:** Barnum Road, Ayer, Massachusetts

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Construction</b>						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2016	\$32.15	\$10.41	\$10.08	\$0.00	\$52.64
	08/01/2016	\$32.15	\$10.91	\$10.08	\$0.00	\$53.14
	12/01/2016	\$32.15	\$10.91	\$10.89	\$0.00	\$53.95
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2016	\$32.22	\$10.41	\$10.08	\$0.00	\$52.71
	08/01/2016	\$32.22	\$10.91	\$10.08	\$0.00	\$53.21
	12/01/2016	\$32.22	\$10.91	\$10.89	\$0.00	\$54.02
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2016	\$32.34	\$10.41	\$10.08	\$0.00	\$52.83
	08/01/2016	\$32.34	\$10.91	\$10.08	\$0.00	\$53.33
	12/01/2016	\$32.34	\$10.91	\$10.89	\$0.00	\$54.14
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2015	\$90.51	\$9.80	\$18.17	\$0.00	\$118.48
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
	12/01/2016	\$33.15	\$7.45	\$12.65	\$0.00	\$53.25
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	12/01/2015	\$34.38	\$10.40	\$5.95	\$0.00	\$50.73
ASPHALT RAKER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$44.23	\$10.00	\$15.15	\$0.00	\$69.38
	12/01/2016	\$45.48	\$10.00	\$15.15	\$0.00	\$70.63
	06/01/2017	\$46.48	\$10.00	\$15.15	\$0.00	\$71.63
	12/01/2017	\$47.48	\$10.00	\$15.15	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$44.23	\$10.00	\$15.15	\$0.00	\$69.38
	12/01/2016	\$45.48	\$10.00	\$15.15	\$0.00	\$70.63
	06/01/2017	\$46.48	\$10.00	\$15.15	\$0.00	\$71.63
	12/01/2017	\$47.48	\$10.00	\$15.15	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i>	06/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
	12/01/2016	\$33.15	\$7.45	\$12.65	\$0.00	\$53.25
For apprentice rates see "Apprentice- LABORER"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2016	\$41.62	\$6.97	\$16.21	\$0.00	\$64.80
	01/01/2017	\$42.92	\$6.97	\$16.21	\$0.00	\$66.10

**Apprentice - BOILERMAKER - Local 29**

**Effective Date - 01/01/2016**

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

**Effective Date - 01/01/2017**

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

**Notes:**

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

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	03/01/2016	\$47.76	\$10.18	\$18.54	\$0.00	\$76.48
BRICKLAYERS LOCAL 3 (LOWELL)	09/01/2016	\$48.66	\$10.18	\$18.62	\$0.00	\$77.46
	03/01/2017	\$49.23	\$10.18	\$18.62	\$0.00	\$78.03

**Classification**

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

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

**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.88	\$10.18	\$18.54	\$0.00	\$52.60
2	60	\$28.66	\$10.18	\$18.54	\$0.00	\$57.38
3	70	\$33.43	\$10.18	\$18.54	\$0.00	\$62.15
4	80	\$38.21	\$10.18	\$18.54	\$0.00	\$66.93
5	90	\$42.98	\$10.18	\$18.54	\$0.00	\$71.70

**Effective Date - 09/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.33	\$10.18	\$18.62	\$0.00	\$53.13
2	60	\$29.20	\$10.18	\$18.62	\$0.00	\$58.00
3	70	\$34.06	\$10.18	\$18.62	\$0.00	\$62.86
4	80	\$38.93	\$10.18	\$18.62	\$0.00	\$67.73
5	90	\$43.79	\$10.18	\$18.62	\$0.00	\$72.59

**Notes:**

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

<b>BULLDOZER/GRADER/SCRAPER</b> <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>CAISSON &amp; UNDERPINNING BOTTOM MAN</b> <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2016	\$37.20	\$7.45	\$13.75	\$0.00	\$58.40
	12/01/2016	\$38.20	\$7.45	\$13.75	\$0.00	\$59.40

For apprentice rates see "Apprentice- LABORER"

<b>CAISSON &amp; UNDERPINNING LABORER</b> <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2016	\$36.05	\$7.45	\$13.75	\$0.00	\$57.25
	12/01/2016	\$37.05	\$7.45	\$13.75	\$0.00	\$58.25

For apprentice rates see "Apprentice- LABORER"

<b>CAISSON &amp; UNDERPINNING TOP MAN</b> <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2016	\$36.05	\$7.45	\$13.75	\$0.00	\$57.25
	12/01/2016	\$37.05	\$7.45	\$13.75	\$0.00	\$58.25

For apprentice rates see "Apprentice- LABORER"

<b>CARBIDE CORE DRILL OPERATOR</b> <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75

For apprentice rates see "Apprentice- LABORER"

<b>CARPENTER</b> <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	03/01/2016	\$37.10	\$9.80	\$16.82	\$0.00	\$63.72
	09/01/2016	\$38.08	\$9.80	\$16.82	\$0.00	\$64.70
	03/01/2017	\$39.05	\$9.80	\$16.82	\$0.00	\$65.67
	09/01/2017	\$40.06	\$9.80	\$16.82	\$0.00	\$66.68
	03/01/2018	\$41.06	\$9.80	\$16.82	\$0.00	\$67.68
	09/01/2018	\$42.10	\$9.80	\$16.82	\$0.00	\$68.72
	03/01/2019	\$43.13	\$9.80	\$16.82	\$0.00	\$69.75

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

**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.55	\$9.80	\$1.63	\$0.00	\$29.98
2	60	\$22.26	\$9.80	\$1.63	\$0.00	\$33.69
3	70	\$25.97	\$9.80	\$11.93	\$0.00	\$47.70
4	75	\$27.83	\$9.80	\$11.93	\$0.00	\$49.56
5	80	\$29.68	\$9.80	\$13.56	\$0.00	\$53.04
6	80	\$29.68	\$9.80	\$13.56	\$0.00	\$53.04
7	90	\$33.39	\$9.80	\$15.19	\$0.00	\$58.38
8	90	\$33.39	\$9.80	\$15.19	\$0.00	\$58.38

**Effective Date - 09/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.04	\$9.80	\$1.63	\$0.00	\$30.47
2	60	\$22.85	\$9.80	\$1.63	\$0.00	\$34.28
3	70	\$26.66	\$9.80	\$11.93	\$0.00	\$48.39
4	75	\$28.56	\$9.80	\$11.93	\$0.00	\$50.29
5	80	\$30.46	\$9.80	\$13.56	\$0.00	\$53.82
6	80	\$30.46	\$9.80	\$13.56	\$0.00	\$53.82
7	90	\$34.27	\$9.80	\$15.19	\$0.00	\$59.26
8	90	\$34.27	\$9.80	\$15.19	\$0.00	\$59.26

**Notes:**

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

CEMENT MASONRY/PLASTERING BRICKLAYERS LOCAL 3 (LOWELL)	01/01/2016	\$43.51	\$10.90	\$18.71	\$1.30	\$74.42
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**Apprentice - CEMENT MASONRY/PLASTERING - Lowell**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.76	\$10.90	\$12.21	\$0.00	\$44.87
2	60	\$26.11	\$10.90	\$13.71	\$1.30	\$52.02
3	65	\$28.28	\$10.90	\$14.71	\$1.30	\$55.19
4	70	\$30.46	\$10.90	\$15.71	\$1.30	\$58.37
5	75	\$32.63	\$10.90	\$16.71	\$1.30	\$61.54
6	80	\$34.81	\$10.90	\$17.71	\$1.30	\$64.72
7	90	\$39.16	\$10.90	\$18.71	\$1.30	\$70.07

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

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CHAIN SAW OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$45.23	\$10.00	\$15.15	\$0.00	\$70.38
	12/01/2016	\$46.48	\$10.00	\$15.15	\$0.00	\$71.63
	06/01/2017	\$47.48	\$10.00	\$15.15	\$0.00	\$72.63
	12/01/2017	\$48.48	\$10.00	\$15.15	\$0.00	\$73.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$30.40	\$10.00	\$15.15	\$0.00	\$55.55
	12/01/2016	\$31.27	\$10.00	\$15.15	\$0.00	\$56.42
	06/01/2017	\$31.96	\$10.00	\$15.15	\$0.00	\$57.11
	12/01/2017	\$32.65	\$10.00	\$15.15	\$0.00	\$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2016	\$49.51	\$7.85	\$16.10	\$0.00	\$73.46
	07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
	01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36

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

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.76	\$7.85	\$0.00	\$0.00	\$32.61
2	55	\$27.23	\$7.85	\$3.66	\$0.00	\$38.74
3	60	\$29.71	\$7.85	\$3.99	\$0.00	\$41.55
4	65	\$32.18	\$7.85	\$4.32	\$0.00	\$44.35
5	70	\$34.66	\$7.85	\$14.11	\$0.00	\$56.62
6	75	\$37.13	\$7.85	\$14.44	\$0.00	\$59.42
7	80	\$39.61	\$7.85	\$14.77	\$0.00	\$62.23
8	90	\$44.56	\$7.85	\$15.44	\$0.00	\$67.85

**Effective Date - 07/01/2016**

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

**Notes:**

Steps are 750 hrs.

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

DEMO: ADZEMAN <i>LABORERS - ZONE 2</i>	12/01/2015	\$35.50	\$7.45	\$13.55	\$0.00	\$56.50
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Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR LABORERS - ZONE 2	12/01/2015	\$36.50	\$7.45	\$13.55	\$0.00	\$57.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS LABORERS - ZONE 2	12/01/2015	\$36.25	\$7.45	\$13.55	\$0.00	\$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER LABORERS - ZONE 2	12/01/2015	\$36.50	\$7.45	\$13.55	\$0.00	\$57.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR LABORERS - ZONE 2	12/01/2015	\$36.25	\$7.45	\$13.55	\$0.00	\$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER LABORERS - ZONE 2	12/01/2015	\$35.50	\$7.45	\$13.55	\$0.00	\$56.50
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR OPERATING ENGINEERS LOCAL 4	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2015	\$60.34	\$9.80	\$18.17	\$0.00	\$88.31
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2015	\$43.10	\$9.80	\$18.17	\$0.00	\$71.07
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2015	\$64.65	\$9.80	\$18.17	\$0.00	\$92.62
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2015	\$90.51	\$9.80	\$18.17	\$0.00	\$118.48
For apprentice rates see "Apprentice- PILE DRIVER"						
ELECTRICIAN ELECTRICIANS LOCAL 96	12/01/2015	\$39.37	\$8.41	\$13.68	\$0.00	\$61.46

**Apprentice - ELECTRICIAN - Local 96**

**Effective Date - 12/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$15.75	\$8.41	\$0.47	\$0.00	\$24.63
2	43	\$16.93	\$8.41	\$0.51	\$0.00	\$25.85
3	48	\$18.90	\$8.41	\$10.82	\$0.00	\$38.13
4	55	\$21.65	\$8.41	\$11.20	\$0.00	\$41.26
5	65	\$25.59	\$8.41	\$11.75	\$0.00	\$45.75
6	80	\$31.50	\$8.41	\$12.58	\$0.00	\$52.49

**Notes:**

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

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ELEVATOR CONSTRUCTOR <i>ELEVATOR CONSTRUCTORS LOCAL 41</i>	01/01/2016	\$48.77	\$14.43	\$14.96	\$0.00	\$78.16
	01/01/2017	\$49.90	\$15.28	\$15.71	\$0.00	\$80.89

**Apprentice - ELEVATOR CONSTRUCTOR - Local 41**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.39	\$14.43	\$14.96	\$0.00	\$53.78
2	55	\$26.82	\$14.43	\$14.96	\$0.00	\$56.21
3	65	\$31.70	\$14.43	\$14.96	\$0.00	\$61.09
4	70	\$34.14	\$14.43	\$14.96	\$0.00	\$63.53
5	80	\$39.02	\$14.43	\$14.96	\$0.00	\$68.41

**Effective Date - 01/01/2017**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.95	\$15.28	\$15.71	\$0.00	\$55.94
2	55	\$27.45	\$15.28	\$15.71	\$0.00	\$58.44
3	65	\$32.44	\$15.28	\$15.71	\$0.00	\$63.43
4	70	\$34.93	\$15.28	\$15.71	\$0.00	\$65.92
5	80	\$39.92	\$15.28	\$15.71	\$0.00	\$70.91

**Notes:**

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

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

ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 41</i>	01/01/2016	\$34.14	\$14.43	\$14.96	\$0.00	\$63.53
	01/01/2017	\$34.93	\$15.28	\$15.71	\$0.00	\$65.92

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75

For apprentice rates see "Apprentice- LABORER"

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2016	\$41.03	\$10.00	\$14.90	\$0.00	\$65.93
	11/01/2016	\$41.62	\$10.00	\$14.90	\$0.00	\$66.52
	05/01/2017	\$42.50	\$10.00	\$14.90	\$0.00	\$67.40
	11/01/2017	\$43.23	\$10.00	\$14.90	\$0.00	\$68.13
	05/01/2018	\$43.94	\$10.00	\$14.90	\$0.00	\$68.84

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2016	\$42.47	\$10.00	\$14.90	\$0.00	\$67.37
	11/01/2016	\$43.07	\$10.00	\$14.90	\$0.00	\$67.97
	05/01/2017	\$43.96	\$10.00	\$14.90	\$0.00	\$68.86
	11/01/2017	\$44.69	\$10.00	\$14.90	\$0.00	\$69.59
	05/01/2018	\$45.41	\$10.00	\$14.90	\$0.00	\$70.31

For apprentice rates see "Apprentice- OPERATING ENGINEERS"



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2016	\$21.88	\$10.00	\$14.90	\$0.00	\$46.78
	11/01/2016	\$22.23	\$10.00	\$14.90	\$0.00	\$47.13
	05/01/2017	\$22.76	\$10.00	\$14.90	\$0.00	\$47.66
	11/01/2017	\$23.18	\$10.00	\$14.90	\$0.00	\$48.08
	05/01/2018	\$23.61	\$10.00	\$14.90	\$0.00	\$48.51
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 96</i>	12/01/2015	\$39.37	\$8.41	\$13.68	\$0.00	\$61.46
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINT/COMMISSIONING <i>ELECTRICIANS LOCAL 96</i>	12/01/2015	\$39.37	\$8.41	\$13.68	\$0.00	\$61.46
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$36.71	\$10.00	\$15.15	\$0.00	\$61.86
	12/01/2016	\$37.75	\$10.00	\$15.15	\$0.00	\$62.90
	06/01/2017	\$38.59	\$10.00	\$15.15	\$0.00	\$63.74
	12/01/2017	\$39.42	\$10.00	\$15.15	\$0.00	\$64.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER <i>LABORERS - ZONE 2</i>	06/01/2016	\$20.50	\$7.45	\$12.65	\$0.00	\$40.60
	12/01/2016	\$20.50	\$7.45	\$12.65	\$0.00	\$40.60
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE I</i>	03/01/2016	\$42.13	\$9.80	\$17.62	\$0.00	\$69.55

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

**Effective Date - 03/01/2016**

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

**Notes:**

Steps are 750 hrs.

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

FORK LIFT/CHERRY PICKER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$44.23	\$10.00	\$15.15	\$0.00	\$69.38
	12/01/2016	\$45.48	\$10.00	\$15.15	\$0.00	\$70.63
	06/01/2017	\$46.48	\$10.00	\$15.15	\$0.00	\$71.63
	12/01/2017	\$47.48	\$10.00	\$15.15	\$0.00	\$72.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
GENERATOR/LIGHTING PLANT/HEATERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$30.40	\$10.00	\$15.15	\$0.00	\$55.55
	12/01/2016	\$31.27	\$10.00	\$15.15	\$0.00	\$56.42
	06/01/2017	\$31.96	\$10.00	\$15.15	\$0.00	\$57.11
	12/01/2017	\$32.65	\$10.00	\$15.15	\$0.00	\$57.80

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) <i>GLAZIERS LOCAL 35 (ZONE 2)</i>	01/01/2016	\$39.01	\$7.85	\$16.10	\$0.00	\$62.96
	07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
	01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

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

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.51	\$7.85	\$0.00	\$0.00	\$27.36
2	55	\$21.46	\$7.85	\$3.66	\$0.00	\$32.97
3	60	\$23.41	\$7.85	\$3.99	\$0.00	\$35.25
4	65	\$25.36	\$7.85	\$4.32	\$0.00	\$37.53
5	70	\$27.31	\$7.85	\$14.11	\$0.00	\$49.27
6	75	\$29.26	\$7.85	\$14.44	\$0.00	\$51.55
7	80	\$31.21	\$7.85	\$14.77	\$0.00	\$53.83
8	90	\$35.11	\$7.85	\$15.44	\$0.00	\$58.40

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.98	\$7.85	\$0.00	\$0.00	\$27.83
2	55	\$21.98	\$7.85	\$3.66	\$0.00	\$33.49
3	60	\$23.98	\$7.85	\$3.99	\$0.00	\$35.82
4	65	\$25.97	\$7.85	\$4.32	\$0.00	\$38.14
5	70	\$27.97	\$7.85	\$14.11	\$0.00	\$49.93
6	75	\$29.97	\$7.85	\$14.44	\$0.00	\$52.26
7	80	\$31.97	\$7.85	\$14.77	\$0.00	\$54.59
8	90	\$35.96	\$7.85	\$15.44	\$0.00	\$59.25

**Notes:**  
Steps are 750 hrs.

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

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

**Classification**

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

**Apprentice - OPERATING ENGINEERS - Local 4**

**Effective Date - 06/01/2016**

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

**Effective Date - 12/01/2016**

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

**Notes:**

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

HVAC (DUCTWORK) <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	02/01/2016	\$43.31	\$10.70	\$21.95	\$2.28	\$78.24
	08/01/2016	\$44.46	\$10.70	\$21.95	\$2.28	\$79.39
	02/01/2017	\$45.56	\$10.70	\$21.95	\$2.28	\$80.49
	08/01/2017	\$46.66	\$10.70	\$21.95	\$2.28	\$81.59
	02/01/2018	\$47.81	\$10.70	\$21.95	\$2.28	\$82.74

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) <i>ELECTRICIANS LOCAL 96</i>	12/01/2015	\$39.37	\$8.41	\$13.68	\$0.00	\$61.46
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For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR) <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	02/01/2016	\$43.31	\$10.70	\$21.95	\$2.28	\$78.24
	08/01/2016	\$44.46	\$10.70	\$21.95	\$2.28	\$79.39
	02/01/2017	\$45.56	\$10.70	\$21.95	\$2.28	\$80.49
	08/01/2017	\$46.66	\$10.70	\$21.95	\$2.28	\$81.59
	02/01/2018	\$47.81	\$10.70	\$21.95	\$2.28	\$82.74

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (TESTING AND BALANCING -WATER) <i>PIPEFITTERS LOCAL 537</i>	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC MECHANIC <i>PIPEFITTERS LOCAL 537</i>	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03

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

HYDRAULIC DRILLS <i>LABORERS - ZONE 2</i>	06/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
	12/01/2016	\$33.15	\$7.45	\$12.65	\$0.00	\$53.25

For apprentice rates see "Apprentice- LABORER"

INSULATOR (PIPES & TANKS) <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2015	\$43.81	\$11.50	\$13.80	\$0.00	\$69.11
	09/01/2016	\$45.81	\$11.50	\$13.80	\$0.00	\$71.11
	09/01/2017	\$47.81	\$11.50	\$13.80	\$0.00	\$73.11
	09/01/2018	\$50.06	\$11.50	\$13.80	\$0.00	\$75.36
	09/01/2019	\$52.56	\$11.50	\$13.80	\$0.00	\$77.86

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

**Effective Date - 09/01/2015**

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

**Effective Date - 09/01/2016**

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

**Notes:**

Steps are 1 year

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

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (WORCESTER AREA)</i>	03/16/2016	\$43.10	\$7.80	\$20.85	\$0.00	\$71.75
	09/16/2016	\$43.75	\$7.80	\$20.85	\$0.00	\$72.40
	03/16/2017	\$44.35	\$7.80	\$20.85	\$0.00	\$73.00

**Classification**

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

**Apprentice - IRONWORKER - Local 7 Worcester**

**Effective Date - 03/16/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$25.86	\$7.80	\$20.85	\$0.00	\$54.51
2	70	\$30.17	\$7.80	\$20.85	\$0.00	\$58.82
3	75	\$32.33	\$7.80	\$20.85	\$0.00	\$60.98
4	80	\$34.48	\$7.80	\$20.85	\$0.00	\$63.13
5	85	\$36.64	\$7.80	\$20.85	\$0.00	\$65.29
6	90	\$38.79	\$7.80	\$20.85	\$0.00	\$67.44

**Effective Date - 09/16/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.25	\$7.80	\$20.85	\$0.00	\$54.90
2	70	\$30.63	\$7.80	\$20.85	\$0.00	\$59.28
3	75	\$32.81	\$7.80	\$20.85	\$0.00	\$61.46
4	80	\$35.00	\$7.80	\$20.85	\$0.00	\$63.65
5	85	\$37.19	\$7.80	\$20.85	\$0.00	\$65.84
6	90	\$39.38	\$7.80	\$20.85	\$0.00	\$68.03

**Notes:**

Structural 1:6; Ornamental 1:4

**Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 2	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
LABORER LABORERS - ZONE 2	06/01/2016	\$31.65	\$7.45	\$12.65	\$0.00	\$51.75
	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50

**Apprentice - LABORER - Zone 2**

**Effective Date - 06/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$18.99	\$7.45	\$12.65	\$0.00	\$39.09
2	70	\$22.16	\$7.45	\$12.65	\$0.00	\$42.26
3	80	\$25.32	\$7.45	\$12.65	\$0.00	\$45.42
4	90	\$28.49	\$7.45	\$12.65	\$0.00	\$48.59

**Effective Date - 12/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$19.44	\$7.45	\$12.65	\$0.00	\$39.54
2	70	\$22.68	\$7.45	\$12.65	\$0.00	\$42.78
3	80	\$25.92	\$7.45	\$12.65	\$0.00	\$46.02
4	90	\$29.16	\$7.45	\$12.65	\$0.00	\$49.26

**Notes:**

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

LABORER: CARPENTER TENDER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.65	\$7.45	\$12.65	\$0.00	\$51.75
	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.65	\$7.45	\$12.65	\$0.00	\$51.75
	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 2</i>	12/01/2015	\$31.35	\$7.45	\$12.60	\$0.00	\$51.40
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.65	\$7.45	\$12.65	\$0.00	\$51.75
	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.65	\$7.45	\$12.65	\$0.00	\$51.75
	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2016	\$38.08	\$10.18	\$17.70	\$0.00	\$65.96
	08/01/2016	\$38.78	\$10.18	\$17.78	\$0.00	\$66.74
	02/01/2017	\$39.24	\$10.18	\$17.78	\$0.00	\$67.20

**Classification**

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

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

**Effective Date - 02/01/2016**

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

**Effective Date - 08/01/2016**

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

**Notes:**

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

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

**Classification**

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

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

**Effective Date - 02/01/2016**

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

**Effective Date - 08/01/2016**

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

**Notes:**

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

MECH. SWEEPER OPERATOR (ON CONST. SITES) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 2) <i>MILLWRIGHTS LOCAL 1121 - Zone 2</i>	04/01/2015	\$34.69	\$9.80	\$16.21	\$0.00	\$60.70
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**Classification**

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

**Apprentice - MILLWRIGHT - Local 1121 Zone 2**

**Effective Date - 04/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$19.08	\$9.80	\$4.48	\$0.00	\$33.36
2	65	\$22.55	\$9.80	\$13.36	\$0.00	\$45.71
3	75	\$26.02	\$9.80	\$14.18	\$0.00	\$50.00
4	85	\$29.49	\$9.80	\$14.99	\$0.00	\$54.28

**Notes:**

Steps are 2,000 hours

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

<b>MORTAR MIXER</b> <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75

For apprentice rates see "Apprentice- LABORER"

<b>OILER (OTHER THAN TRUCK CRANES,GRADALLS)</b> <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$22.41	\$10.00	\$15.15	\$0.00	\$47.56
	12/01/2016	\$23.06	\$10.00	\$15.15	\$0.00	\$48.21
	06/01/2017	\$23.57	\$10.00	\$15.15	\$0.00	\$48.72
	12/01/2017	\$24.09	\$10.00	\$15.15	\$0.00	\$49.24

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OILER (TRUCK CRANES, GRADALLS)</b> <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$26.29	\$10.00	\$15.15	\$0.00	\$51.44
	12/01/2016	\$27.04	\$10.00	\$15.15	\$0.00	\$52.19
	06/01/2017	\$27.64	\$10.00	\$15.15	\$0.00	\$52.79
	12/01/2017	\$28.25	\$10.00	\$15.15	\$0.00	\$53.40

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OTHER POWER DRIVEN EQUIPMENT - CLASS II</b> <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>PAINTER (BRIDGES/TANKS)</b> <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2016	\$49.51	\$7.85	\$16.10	\$0.00	\$73.46
	07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
	01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36

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

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.76	\$7.85	\$0.00	\$0.00	\$32.61
2	55	\$27.23	\$7.85	\$3.66	\$0.00	\$38.74
3	60	\$29.71	\$7.85	\$3.99	\$0.00	\$41.55
4	65	\$32.18	\$7.85	\$4.32	\$0.00	\$44.35
5	70	\$34.66	\$7.85	\$14.11	\$0.00	\$56.62
6	75	\$37.13	\$7.85	\$14.44	\$0.00	\$59.42
7	80	\$39.61	\$7.85	\$14.77	\$0.00	\$62.23
8	90	\$44.56	\$7.85	\$15.44	\$0.00	\$67.85

**Effective Date - 07/01/2016**

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

**Notes:**  
Steps are 750 hrs.

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

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2016	\$40.41	\$7.85	\$16.10	\$0.00	\$64.36
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$41.36	\$7.85	\$16.10	\$0.00	\$65.31
	01/01/2017	\$42.31	\$7.85	\$16.10	\$0.00	\$66.26

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

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.21	\$7.85	\$0.00	\$0.00	\$28.06
2	55	\$22.23	\$7.85	\$3.66	\$0.00	\$33.74
3	60	\$24.25	\$7.85	\$3.99	\$0.00	\$36.09
4	65	\$26.27	\$7.85	\$4.32	\$0.00	\$38.44
5	70	\$28.29	\$7.85	\$14.11	\$0.00	\$50.25
6	75	\$30.31	\$7.85	\$14.44	\$0.00	\$52.60
7	80	\$32.33	\$7.85	\$14.77	\$0.00	\$54.95
8	90	\$36.37	\$7.85	\$15.44	\$0.00	\$59.66

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.68	\$7.85	\$0.00	\$0.00	\$28.53
2	55	\$22.75	\$7.85	\$3.66	\$0.00	\$34.26
3	60	\$24.82	\$7.85	\$3.99	\$0.00	\$36.66
4	65	\$26.88	\$7.85	\$4.32	\$0.00	\$39.05
5	70	\$28.95	\$7.85	\$14.11	\$0.00	\$50.91
6	75	\$31.02	\$7.85	\$14.44	\$0.00	\$53.31
7	80	\$33.09	\$7.85	\$14.77	\$0.00	\$55.71
8	90	\$37.22	\$7.85	\$15.44	\$0.00	\$60.51

**Notes:**  
Steps are 750 hrs.

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

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2016	\$38.47	\$7.85	\$16.10	\$0.00	\$62.42
PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$39.42	\$7.85	\$16.10	\$0.00	\$63.37
	01/01/2017	\$40.37	\$7.85	\$16.10	\$0.00	\$64.32

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

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.24	\$7.85	\$0.00	\$0.00	\$27.09
2	55	\$21.16	\$7.85	\$3.66	\$0.00	\$32.67
3	60	\$23.08	\$7.85	\$3.99	\$0.00	\$34.92
4	65	\$25.01	\$7.85	\$4.32	\$0.00	\$37.18
5	70	\$26.93	\$7.85	\$14.11	\$0.00	\$48.89
6	75	\$28.85	\$7.85	\$14.44	\$0.00	\$51.14
7	80	\$30.78	\$7.85	\$14.77	\$0.00	\$53.40
8	90	\$34.62	\$7.85	\$15.44	\$0.00	\$57.91

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.71	\$7.85	\$0.00	\$0.00	\$27.56
2	55	\$21.68	\$7.85	\$3.66	\$0.00	\$33.19
3	60	\$23.65	\$7.85	\$3.99	\$0.00	\$35.49
4	65	\$25.62	\$7.85	\$4.32	\$0.00	\$37.79
5	70	\$27.59	\$7.85	\$14.11	\$0.00	\$49.55
6	75	\$29.57	\$7.85	\$14.44	\$0.00	\$51.86
7	80	\$31.54	\$7.85	\$14.77	\$0.00	\$54.16
8	90	\$35.48	\$7.85	\$15.44	\$0.00	\$58.77

**Notes:**  
Steps are 750 hrs.

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

PAINTER (TRAFFIC MARKINGS)	06/01/2016	\$31.65	\$7.45	\$12.65	\$0.00	\$51.75
LABORERS - ZONE 2	12/01/2016	\$32.40	\$7.45	\$12.65	\$0.00	\$52.50
For Apprentice rates see "Apprentice- LABORER"						
PAINTER / TAPER (BRUSH, NEW) *	01/01/2016	\$39.01	\$7.85	\$16.10	\$0.00	\$62.96
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
	01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

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

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.51	\$7.85	\$0.00	\$0.00	\$27.36
2	55	\$21.46	\$7.85	\$3.66	\$0.00	\$32.97
3	60	\$23.41	\$7.85	\$3.99	\$0.00	\$35.25
4	65	\$25.36	\$7.85	\$4.32	\$0.00	\$37.53
5	70	\$27.31	\$7.85	\$14.11	\$0.00	\$49.27
6	75	\$29.26	\$7.85	\$14.44	\$0.00	\$51.55
7	80	\$31.21	\$7.85	\$14.77	\$0.00	\$53.83
8	90	\$35.11	\$7.85	\$15.44	\$0.00	\$58.40

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.98	\$7.85	\$0.00	\$0.00	\$27.83
2	55	\$21.98	\$7.85	\$3.66	\$0.00	\$33.49
3	60	\$23.98	\$7.85	\$3.99	\$0.00	\$35.82
4	65	\$25.97	\$7.85	\$4.32	\$0.00	\$38.14
5	70	\$27.97	\$7.85	\$14.11	\$0.00	\$49.93
6	75	\$29.97	\$7.85	\$14.44	\$0.00	\$52.26
7	80	\$31.97	\$7.85	\$14.77	\$0.00	\$54.59
8	90	\$35.96	\$7.85	\$15.44	\$0.00	\$59.25

**Notes:**

Steps are 750 hrs.

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

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2016	\$37.07	\$7.85	\$16.10	\$0.00	\$61.02
PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$38.02	\$7.85	\$16.10	\$0.00	\$61.97
	01/01/2017	\$38.97	\$7.85	\$16.10	\$0.00	\$62.92

**Classification**

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

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

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.54	\$7.85	\$0.00	\$0.00	\$26.39
2	55	\$20.39	\$7.85	\$3.66	\$0.00	\$31.90
3	60	\$22.24	\$7.85	\$3.99	\$0.00	\$34.08
4	65	\$24.10	\$7.85	\$4.32	\$0.00	\$36.27
5	70	\$25.95	\$7.85	\$14.11	\$0.00	\$47.91
6	75	\$27.80	\$7.85	\$14.44	\$0.00	\$50.09
7	80	\$29.66	\$7.85	\$14.77	\$0.00	\$52.28
8	90	\$33.36	\$7.85	\$15.44	\$0.00	\$56.65

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.01	\$7.85	\$0.00	\$0.00	\$26.86
2	55	\$20.91	\$7.85	\$3.66	\$0.00	\$32.42
3	60	\$22.81	\$7.85	\$3.99	\$0.00	\$34.65
4	65	\$24.71	\$7.85	\$4.32	\$0.00	\$36.88
5	70	\$26.61	\$7.85	\$14.11	\$0.00	\$48.57
6	75	\$28.52	\$7.85	\$14.44	\$0.00	\$50.81
7	80	\$30.42	\$7.85	\$14.77	\$0.00	\$53.04
8	90	\$34.22	\$7.85	\$15.44	\$0.00	\$57.51

**Notes:**  
Steps are 750 hrs.

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

PANEL & PICKUP TRUCKS DRIVER  
TEAMSTERS JOINT COUNCIL NO. 10 ZONE B  
12/01/2012    \$30.28    \$9.07    \$8.00    \$0.00    \$47.35

PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)  
PILE DRIVER LOCAL 56 (ZONE 2)  
For apprentice rates see "Apprentice- PILE DRIVER"  
09/01/2013    \$37.01    \$9.80    \$18.17    \$0.00    \$64.98

PILE DRIVER  
PILE DRIVER LOCAL 56 (ZONE 2)  
09/01/2013    \$37.01    \$9.80    \$18.17    \$0.00    \$64.98

**Apprentice - PILE DRIVER - Local 56 Zone 2**

**Effective Date - 09/01/2013**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**Notes:** Apprentice wages shall be no less than the following Steps;  
(Same as set in Zone 1)  
1\$50.05/2\$54.25/3\$58.46/4\$60.56/5\$62.66/6\$62.66/7\$66.87/8\$66.87

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIPEFITTER & STEAMFITTER <i>PIPEFITTERS LOCAL 537</i>	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03

**Apprentice - PIPEFITTER - Local 537**

**Effective Date - 03/01/2016**

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

**Effective Date - 09/01/2016**

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

**Notes:**

\*\* 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.  
Refrig/AC Mechanic \*\*1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

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

PIPELAYER <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
PLUMBERS & GASFITTERS <i>PLUMBERS &amp; GASFITTERS LOCAL 12</i>	03/01/2016	\$51.36	\$11.07	\$15.14	\$0.00	\$77.57
	09/01/2016	\$52.41	\$11.07	\$15.14	\$0.00	\$78.62
	03/01/2017	\$53.41	\$11.07	\$15.14	\$0.00	\$79.62

**Classification**

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

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

**Effective Date - 03/01/2016**

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

**Effective Date - 09/01/2016**

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

**Notes:**

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

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

PNEUMATIC CONTROLS (TEMP.) <i>PIPEFITTERS LOCAL 537</i>	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03

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

PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75

For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER <i>LABORERS - ZONE 2</i>	06/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
	12/01/2016	\$33.40	\$7.45	\$12.65	\$0.00	\$53.50

For apprentice rates see "Apprentice- LABORER"

POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$44.23	\$10.00	\$15.15	\$0.00	\$69.38
	12/01/2016	\$45.48	\$10.00	\$15.15	\$0.00	\$70.63
	06/01/2017	\$46.48	\$10.00	\$15.15	\$0.00	\$71.63
	12/01/2017	\$47.48	\$10.00	\$15.15	\$0.00	\$72.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$44.23	\$10.00	\$15.15	\$0.00	\$69.38
	12/01/2016	\$45.48	\$10.00	\$15.15	\$0.00	\$70.63
	06/01/2017	\$46.48	\$10.00	\$15.15	\$0.00	\$71.63
	12/01/2017	\$47.48	\$10.00	\$15.15	\$0.00	\$72.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$30.40	\$10.00	\$15.15	\$0.00	\$55.55
	12/01/2016	\$31.27	\$10.00	\$15.15	\$0.00	\$56.42
	06/01/2017	\$31.96	\$10.00	\$15.15	\$0.00	\$57.11
	12/01/2017	\$32.65	\$10.00	\$15.15	\$0.00	\$57.80

For apprentice rates see "Apprentice- OPERATING ENGINEERS"



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
READY-MIX CONCRETE DRIVER <i>TEAMSTERS LOCAL 170</i>	05/01/2016	\$24.72	\$9.67	\$7.89	\$0.00	\$42.28
	12/01/2016	\$24.75	\$9.67	\$7.89	\$0.00	\$42.31
	01/01/2017	\$24.75	\$9.96	\$7.89	\$0.00	\$42.60
	02/02/2017	\$24.81	\$9.96	\$7.98	\$0.00	\$42.75
	03/01/2017	\$24.84	\$9.96	\$8.07	\$0.00	\$42.87
	04/01/2017	\$24.88	\$9.96	\$8.17	\$0.00	\$43.01
	05/01/2017	\$24.92	\$9.96	\$8.26	\$0.00	\$43.14
	12/01/2017	\$24.95	\$9.96	\$8.26	\$0.00	\$43.17
	01/01/2018	\$24.95	\$10.24	\$8.26	\$0.00	\$43.45
	02/02/2018	\$25.01	\$10.24	\$8.36	\$0.00	\$43.61
	03/01/2018	\$25.04	\$10.24	\$8.46	\$0.00	\$43.74
	05/01/2018	\$25.09	\$10.24	\$8.56	\$0.00	\$43.89
	12/01/2018	\$25.12	\$10.24	\$8.56	\$0.00	\$43.92
	01/01/2019	\$25.12	\$10.41	\$8.56	\$0.00	\$44.09
	12/01/2019	\$25.15	\$10.41	\$8.56	\$0.00	\$44.12
	01/01/2020	\$25.15	\$10.46	\$8.56	\$0.00	\$44.17
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) <i>CARPENTERS -ZONE 2 (Residential Wood)</i>	04/01/2011	\$24.24	\$8.67	\$15.51	\$0.00	\$48.42
RESIDENTIAL WOOD FRAME CARPENTER ** ** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement. <i>CARPENTERS -ZONE 2 (Residential Wood)</i> As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.	05/01/2011	\$24.24	\$6.34	\$6.23	\$0.00	\$36.81

**Apprentice - CARPENTER (Residential Wood Frame) - Zone 2**

**Effective Date - 05/01/2011**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$14.54	\$6.34	\$0.00	\$0.00	\$20.88
2	60	\$14.54	\$6.34	\$6.23	\$0.00	\$27.11
3	65	\$15.76	\$6.34	\$6.23	\$0.00	\$28.33
4	70	\$16.97	\$6.34	\$6.23	\$0.00	\$29.54
5	75	\$18.18	\$6.34	\$6.23	\$0.00	\$30.75
6	80	\$19.39	\$6.34	\$6.23	\$0.00	\$31.96
7	85	\$20.60	\$6.34	\$6.23	\$0.00	\$33.17
8	90	\$21.82	\$6.34	\$6.23	\$0.00	\$34.39

**Notes:**

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

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofers Waterproofing &Roofers Damproofg) <i>ROOFERS LOCAL 33</i>	02/01/2016	\$40.11	\$11.00	\$12.90	\$0.00	\$64.01

**Apprentice - ROOFER - Local 33**

**Effective Date - 02/01/2016**

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

**Notes: \*\* 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1**  
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.

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

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

**Classification**

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

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

**Effective Date - 02/01/2016**

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

**Effective Date - 08/01/2016**

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

**Notes:**  
Steps are 6 mos.

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

SIGN ERECTOR PAINTERS LOCAL 35 - ZONE 2	06/01/2013	\$25.81	\$7.07	\$7.05	\$0.00	\$39.93
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**Classification**

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

**Apprentice - SIGN ERECTOR - Local 35 Zone 2**

**Effective Date - 06/01/2013**

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

**Notes:**  
Steps are 4 mos.

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

SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2016	\$32.44	\$10.41	\$10.08	\$0.00	\$52.93
	08/01/2016	\$32.44	\$10.91	\$10.08	\$0.00	\$53.43
	12/01/2016	\$32.44	\$10.91	\$10.89	\$0.00	\$54.24
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2016	\$32.73	\$10.41	\$10.08	\$0.00	\$53.22
	08/01/2016	\$32.73	\$10.91	\$10.08	\$0.00	\$53.72
	12/01/2016	\$32.73	\$10.91	\$10.89	\$0.00	\$54.53
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1</i>	03/01/2016	\$54.43	\$8.67	\$16.80	\$0.00	\$79.90
	10/01/2016	\$55.53	\$8.67	\$16.80	\$0.00	\$81.00
	03/01/2017	\$56.53	\$8.67	\$16.80	\$0.00	\$82.00

**Classification**

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

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

**Effective Date - 03/01/2016**

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

**Effective Date - 10/01/2016**

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

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

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

<b>STEAM BOILER OPERATOR</b> <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN</b> <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>TERRAZZO FINISHERS</b> <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2016	\$48.80	\$10.18	\$19.14	\$0.00	\$78.12
	08/01/2016	\$49.70	\$10.18	\$19.22	\$0.00	\$79.10
	02/01/2017	\$50.27	\$10.18	\$19.22	\$0.00	\$79.67

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

**Effective Date - 02/01/2016**

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

**Effective Date - 08/01/2016**

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

**Notes:**

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

TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2016	\$37.45	\$7.45	\$13.75	\$0.00	\$58.65
	12/01/2016	\$38.45	\$7.45	\$13.75	\$0.00	\$59.65
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2016	\$36.17	\$7.45	\$13.75	\$0.00	\$57.37
	12/01/2016	\$37.17	\$7.45	\$13.75	\$0.00	\$58.37
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2016	\$36.05	\$7.45	\$13.75	\$0.00	\$57.25
	12/01/2016	\$37.05	\$7.45	\$13.75	\$0.00	\$58.25
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2016	\$43.81	\$10.00	\$15.15	\$0.00	\$68.96
	12/01/2016	\$45.04	\$10.00	\$15.15	\$0.00	\$70.19
	06/01/2017	\$46.03	\$10.00	\$15.15	\$0.00	\$71.18
	12/01/2017	\$47.02	\$10.00	\$15.15	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2016	\$33.02	\$10.41	\$10.08	\$0.00	\$53.51
	08/01/2016	\$33.02	\$10.91	\$10.08	\$0.00	\$54.01
	12/01/2016	\$33.02	\$10.91	\$10.89	\$0.00	\$54.82
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	06/01/2016	\$48.33	\$7.45	\$14.15	\$0.00	\$69.93
	12/01/2016	\$49.33	\$7.45	\$14.15	\$0.00	\$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	06/01/2016	\$50.33	\$7.45	\$14.15	\$0.00	\$71.93
	12/01/2016	\$51.33	\$7.45	\$14.15	\$0.00	\$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2016	\$40.40	\$7.45	\$14.15	\$0.00	\$62.00
	12/01/2016	\$41.40	\$7.45	\$14.15	\$0.00	\$63.00

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) LABORERS (FREE AIR TUNNEL)	06/01/2016	\$42.40	\$7.45	\$14.15	\$0.00	\$64.00
	12/01/2016	\$43.40	\$7.45	\$14.15	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	06/01/2016	\$32.44	\$10.41	\$10.08	\$0.00	\$52.93
	08/01/2016	\$32.44	\$10.91	\$10.08	\$0.00	\$53.43
	12/01/2016	\$32.44	\$10.91	\$10.89	\$0.00	\$54.24
VOICE-DATA-VIDEO TECHNICIAN ELECTRICIANS LOCAL 96	12/01/2015	\$26.83	\$8.41	\$12.35	\$0.00	\$47.59

**Apprentice - VOICE-DATA-VIDEO TECHNICIAN - Local 96**

**Effective Date - 12/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$13.42	\$8.41	\$3.78	\$0.00	\$25.61
2	55	\$14.76	\$8.41	\$3.82	\$0.00	\$26.99
3	60	\$16.10	\$8.41	\$12.03	\$0.00	\$36.54
4	65	\$17.44	\$8.41	\$12.07	\$0.00	\$37.92
5	70	\$18.78	\$8.41	\$12.11	\$0.00	\$39.30
6	75	\$20.12	\$8.41	\$12.15	\$0.00	\$40.68
7	80	\$21.46	\$8.41	\$12.19	\$0.00	\$42.06
8	85	\$22.81	\$8.41	\$12.23	\$0.00	\$43.45

**Notes:**

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

WAGON DRILL OPERATOR LABORERS - ZONE 2	06/01/2016	\$31.90	\$7.45	\$12.65	\$0.00	\$52.00
	12/01/2016	\$32.65	\$7.45	\$12.65	\$0.00	\$52.75

For apprentice rates see "Apprentice- LABORER"

WASTE WATER PUMP OPERATOR OPERATING ENGINEERS LOCAL 4	06/01/2016	\$44.23	\$10.00	\$15.15	\$0.00	\$69.38
	12/01/2016	\$45.48	\$10.00	\$15.15	\$0.00	\$70.63
	06/01/2017	\$46.48	\$10.00	\$15.15	\$0.00	\$71.63
	12/01/2017	\$47.48	\$10.00	\$15.15	\$0.00	\$72.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

WATER METER INSTALLER PLUMBERS & GASFITTERS LOCAL 12	03/01/2016	\$51.36	\$11.07	\$15.14	\$0.00	\$77.57
	09/01/2016	\$52.41	\$11.07	\$15.14	\$0.00	\$78.62
	03/01/2017	\$53.41	\$11.07	\$15.14	\$0.00	\$79.62

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

**Outside Electrical - East**

CABLE TECHNICIAN (Power Zone) OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104	08/30/2015	\$26.11	\$7.25	\$1.78	\$0.00	\$35.14
	08/28/2016	\$26.61	\$7.50	\$1.80	\$0.00	\$35.91
	09/03/2017	\$27.14	\$7.75	\$1.81	\$0.00	\$36.70

For apprentice rates see "Apprentice- LINEMAN"

CABLEMAN (Underground Ducts & Cables) OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104	08/30/2015	\$36.98	\$7.25	\$8.12	\$0.00	\$52.35
	08/28/2016	\$37.70	\$7.50	\$8.87	\$0.00	\$54.07
	09/03/2017	\$38.45	\$7.75	\$9.53	\$0.00	\$55.73

For apprentice rates see "Apprentice- LINEMAN"

<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$30.46	\$7.25	\$8.34	\$0.00	\$46.05
	08/28/2016	\$31.05	\$7.50	\$8.89	\$0.00	\$47.44
	09/03/2017	\$31.66	\$7.75	\$9.44	\$0.00	\$48.85
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$23.93	\$7.25	\$1.72	\$0.00	\$32.90
	08/28/2016	\$24.39	\$7.50	\$1.73	\$0.00	\$33.62
	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$36.98	\$7.25	\$12.29	\$0.00	\$56.52
	08/28/2016	\$37.70	\$7.50	\$12.95	\$0.00	\$58.15
	09/03/2017	\$38.45	\$7.75	\$13.61	\$0.00	\$59.81
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$32.63	\$7.25	\$9.05	\$0.00	\$48.93
	08/28/2016	\$33.26	\$7.50	\$9.63	\$0.00	\$50.39
	09/03/2017	\$33.92	\$7.75	\$10.21	\$0.00	\$51.88
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$23.93	\$7.25	\$1.72	\$0.00	\$32.90
	08/28/2016	\$24.39	\$7.50	\$1.73	\$0.00	\$33.62
	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$19.58	\$7.25	\$1.59	\$0.00	\$28.42
	08/28/2016	\$19.96	\$7.50	\$1.60	\$0.00	\$29.06
	09/03/2017	\$20.35	\$7.75	\$1.61	\$0.00	\$29.71
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$43.51	\$7.25	\$15.06	\$0.00	\$65.82
	08/28/2016	\$44.35	\$7.50	\$15.83	\$0.00	\$67.68
	09/03/2017	\$45.23	\$7.75	\$16.61	\$0.00	\$69.59



**Classification**

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

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

**Effective Date - 08/30/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.11	\$7.25	\$3.28	\$0.00	\$36.64
2	65	\$28.28	\$7.25	\$3.35	\$0.00	\$38.88
3	70	\$30.46	\$7.25	\$3.41	\$0.00	\$41.12
4	75	\$32.63	\$7.25	\$4.98	\$0.00	\$44.86
5	80	\$34.81	\$7.25	\$5.04	\$0.00	\$47.10
6	85	\$36.98	\$7.25	\$5.11	\$0.00	\$49.34
7	90	\$39.16	\$7.25	\$7.17	\$0.00	\$53.58

**Effective Date - 08/28/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.61	\$7.50	\$3.30	\$0.00	\$37.41
2	65	\$28.83	\$7.50	\$3.36	\$0.00	\$39.69
3	70	\$31.05	\$7.50	\$3.43	\$0.00	\$41.98
4	75	\$33.26	\$7.50	\$5.00	\$0.00	\$45.76
5	80	\$35.48	\$7.50	\$5.06	\$0.00	\$48.04
6	85	\$37.70	\$7.50	\$5.13	\$0.00	\$50.33
7	90	\$39.92	\$7.50	\$7.20	\$0.00	\$54.62

**Notes:**

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

TELEDATA CABLE SPLICER  
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104      01/01/2016      \$28.98      \$4.25      \$3.12      \$0.00      \$36.35

TELEDATA LINEMAN/EQUIPMENT OPERATOR  
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104      01/01/2016      \$27.31      \$4.25      \$3.07      \$0.00      \$34.63

TELEDATA WIREMAN/INSTALLER/TECHNICIAN  
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104      01/01/2016      \$27.31      \$4.25      \$3.07      \$0.00      \$34.63

TREE TRIMMER  
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104      01/31/2016      \$18.51      \$3.55      \$0.00      \$0.00      \$22.06

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.

TREE TRIMMER GROUNDMAN  
OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104      01/31/2016      \$16.32      \$3.55      \$0.00      \$0.00      \$19.87

This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.

Additional Apprentices Information:

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

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

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

\*\* Multiple ratios are listed in the comment field.

\*\*\* APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

\*\*\*\* APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

# **Appendix B**

## **Non-Price Proposal Forms**



## Proposal Package Forms

Please complete the forms requested in Part 2 of the RFP and attached herein.

### DEADLINE FOR SUBMISSION / PROPOSAL OPENING:

Separately sealed non-price and price proposals (clearly identified on the sealed envelopes, labeled with the name and address of the applicant contractor) must be received at the DPW, 25 Brook Street, Ayer, MA, 01432 on or before:

1:00 P.M., Friday, JULY 29, 2016

at which time they will be opened and registered before a witness.

### BID DOCUMENTS

The requested documents, signed by the authorized signatory of the bidder, shall be included in the sealed bid.

## PRE-ENGINEERED CONSTRUCTION NON-PRICE PROPOSAL FORM

To the Town of Ayer (Awarding Authority):

**A.** The undersigned proposes to furnish all labor and materials required for the **Design, Prefabrication, Site Assembly/Installation, and all services required to complete and deliver a pre-engineered building at the Grove Pond Water Treatment Plant (Project)** in Ayer, Massachusetts, in accordance with the accompanying Construction Document Drawings and Specifications prepared by **Town of Ayer DPW, BLW Engineers, Inc., and William Sloan Associates** for the contract price specified below.

This proposal includes addenda numbered \_\_\_\_\_ through \_\_\_\_\_

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

The undersigned further certifies under penalty of perjury that if awarded a contract, he/she guarantees completion of all work required within 120 calendar days from the notice to proceed.

The undersigned agrees that, if he/she is selected as general contractor, he/she will within ten (10) calendar days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the Awarding Authority, execute a contract in accordance with the terms of this bid/proposal and furnish a performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of the contract price, provided, however, that if there is more than one (1) surety company, the surety companies shall be jointly and severally liable.

The undersigned hereby certifies that he/she is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least ten (10) hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he/she will comply fully with all laws and regulations applicable to awards made subject to section forty-four A (44A).

The Proposer covenants, that (1) presently, there is no financial interest and shall not acquire any such interest direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under this Agreement or which would violate M.O.L. c. 268A, as amended; (2) in the performance of this Contract, no person having any such interest shall be employed by the Contractor or engaged as a subcontractor by the Contractor; and (3) no partner or employee of the firm is related by blood or marriage to any Board Member or employee of the Awarding Authority.

The non-price proposal must consist of the following documents:

The non-price proposal must consist of the following documents:

1. Non-Price Proposal Form signed and submitted.
2. Current Certificate of Eligibility for Pre-engineered Construction/Prefab or General Building Construction.

3. Completed Contractor Update Statement.
4. Certification by the State Board of Building Regulations and Standards that the manufacturer of the pre-engineered buildings meets state building code requirements.
5. A set of detailed plans and specifications for the proposed pre-engineered buildings. Proposals must include all manufacturers' specifications governing the materials and equipment used in the pre-engineered building. The plans submitted with each proposal must provide all drawings necessary to portray to the Town of Ayer DPW all pertinent design details of the pre-engineered buildings, including:
  - a. an installation plan showing the proposed accurate location of the pre-engineered building on the property; an indication of the location on the pre-engineered building at which utility service connections are proposed; and locations of existing utility services to which the proposed pre-engineered building can be connected.
  - b. mounting plans and details.
  - c. architectural type floor plans.
  - d. factory plans and details of passageway elements and entrance ramps.
  - e. factory plans and details of manufacture of structural elements including floors, walls, and roof.
  - f. factory plans and details of service appurtenances including electrical, plumbing, and HVAC. Such details must include all light fixtures, outlets, switches, controls, smoke detectors, and location and capacity/rating of all equipment, fixtures, and appliances.
  - g. factory details of windows and doors.
  - h. factory finish details for wall finishes, floor finishes, exterior skin finish, and trim.
6. The complete terms of all warranties provided by the manufacturer or by the offeror relative to the design, manufacture, and installation of the pre-engineered buildings, including both general warranties and special warranties associated with particular components and equipment.
7. Certification of state tax laws, reporting of employees and contractors, and withholding and remitting of child support, as required by M.G.L. c. 62C, § 49A and of non-collusion, signed and submitted.
8. Certification that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least ten hours in duration at the time the employee begins work and shall furnish documentation of successful completion of such course with the first certified payroll report for each employee, signed and submitted.
9. Certification that the proposed pre-engineered buildings will be either (1) manufactured within Massachusetts; or (2) manufactured outside of Massachusetts but within the United States, or (3) manufactured outside of the United States, signed and submitted.
10. Certification that the proposed pre-engineered building plans comply with all Building Codes, including the Stretch Building Code, and will meet the regulations and requirements of the Commonwealth's Manufactured Building Program, signed and submitted.

The following forms to be submitted with Proposer's response are found in **Appendix B**:

- Non-Price Proposal Form
- Past Performance / Reference Form
- Certificate of Non-Collusion & Tax Compliance

- Certificate of Signature Authority
- Prevailing Wage Compliance Form
- Sub-Vendor/Sub-Contractor Form
- DCAMM Certificate of Eligibility for Pre-engineered Construction/Prefabrication or General Construction and Update Statement
- OSHA Certification Form

Submissions to be provided post award

- Insurance Certificate: As outlined on attached form included in this solicitation, must be provided by the **awarded vendor** within ten (10) business days of Notice of Award.
- Contact names, phone numbers and e-mail addresses are required by the Town of Ayer.
- Vendor TIN Certification (W-9)

Date \_\_\_\_\_

\_\_\_\_\_  
(Company Name of Proposer)

By \_\_\_\_\_  
(Signature of Authorized Signatory)

\_\_\_\_\_  
(Print Name & Title of Person Signing Proposal)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
(City, State and Zip Code)

\_\_\_\_\_  
(Telephone Number & Fax Number)

\_\_\_\_\_  
(E-mail address)

## PAST PERFORMANCE/REFERENCE SHEET

The Town of Ayer requires that the Contractor demonstrate experience providing similar services for a minimum of three (3) projects similar in Scope. Three (3) references shall be provided for past performance.

Please use the below format for all references submitted and provide as much detail as possible in the Summary section.

<b>Past Performance / Reference Title:</b>	
Period of Performance	
POC* Name & Title	
Telephone	
Fax	
Email	
Summary of supplies or services provided	

\*Point of Contact of firm/agency providing reference. POCs shall be individuals that worked directly with the applicant.



**REVENUE ENFORCEMENT AND PROTECTION CERTIFICATION**

The undersigned, pursuant to Massachusetts General Laws Chapter 62C, section 49A, certifies under the pains and penalties of perjury, that the proposer has complied with all laws of the Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding and remitting child support, as well as paid all contributions and payments in lieu of contributions pursuant to MGL 151A, Section 19A(b).

**CERTIFICATE OF NON-COLLUSION**

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

The proposal attached hereto is submitted by:

Name of Firm: \_\_\_\_\_

By: \_\_\_\_\_  
(Signed Name) (Title) (Date)

\_\_\_\_\_  
(Printed Name) (Title)

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

City, State, Zip Code: \_\_\_\_\_

Tel. No. \_\_\_\_\_; FAX. No. \_\_\_\_\_

Fed. ID No.: \_\_\_\_\_

**CERTIFICATE OF AUTHORITY TO SIGN**

At a duly authorized meeting of the Board of Directors of \_\_\_\_\_  
(Company Name)  
held on \_\_\_\_\_, at which all the Directors were present or waived notice, it was voted  
(Date)  
that \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_  
(Officer Names)  
of this Company, be and he/she/they hereby is/are authorized to execute Bidding Document,  
Contracts and Bonds in the name and on behalf of said Company, and affix its corporate seal thereto,  
and such execution of any contract or obligation in this Company's name on its behalf by such  
\_\_\_\_\_ under seal of the Company shall be valid and binding upon this Company.  
(Officer/Title)

I hereby certify that the above vote has not been amended or rescinded and remains in full effect as of  
this date \_\_\_\_\_.

A true copy,

ATTEST \_\_\_\_\_  
Clerk

(Corporate Seal)

**(General Bidders and Sub-Bidders shall complete and submit this Form or a similar Form as proof of Authority to Sign)**

## WEEKLY PAYROLL RECORDS REPORT & STATEMENT OF COMPLIANCE

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

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

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

### STATEMENT OF COMPLIANCE

\_\_\_\_\_, 20\_\_\_\_\_

I, \_\_\_\_\_, \_\_\_\_\_  
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by

\_\_\_\_\_ on the \_\_\_\_\_  
(Contractor, subcontractor or public body) (Building or project)

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

Signature \_\_\_\_\_

Title \_\_\_\_\_

## SUB-CONTRACTOR FORM

**Please list below any sub-contractors that will be involved with this project.**

1. Company Name: \_\_\_\_\_

Service Provided: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone #: \_\_\_\_\_

2. Company Name: \_\_\_\_\_

Service Provided: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone #: \_\_\_\_\_

3. Company Name: \_\_\_\_\_

Service Provided: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone #: \_\_\_\_\_

**SPECIAL NOTICE TO AWARDING AUTHORITY**  
**BIDDERS' UPDATE STATEMENTS ARE NOT PUBLIC RECORDS AND**  
**ARE NOT OPEN TO PUBLIC INSPECTION (M.G.L. C.149, §44D)**

EFFECTIVE MARCH 30, 2010

**Commonwealth of Massachusetts**  
**Division of Capital Asset Management**  
**PRIME/GENERAL CONTRACTOR**  
**UPDATE STATEMENT**

**TO ALL BIDDERS AND AWARDING AUTHORITIES**

A COMPLETED AND SIGNED PRIME/GENERAL CONTRACTOR UPDATE STATEMENT MUST BE SUBMITTED WITH EVERY PRIME/GENERAL BID FOR A CONTRACT PURSUANT TO M.G.L. c.149, §44A AND M.G.L. c. 149A. ANY PRIME/GENERAL BID SUBMITTED WITHOUT AN APPROPRIATE UPDATE STATEMENT IS INVALID AND MUST BE REJECTED.

***Caution: This form is to be used for submitting Prime/General Contract bids. It is not to be used for submitting Filed Sub-Bids or Trade Sub-Bids.***

**AWARDING AUTHORITIES**

If the Awarding Authority determines that the bidder does not demonstrably possess the skill, ability, and integrity necessary to perform the work on the project, it must reject the bid.

---

**BIDDER'S AFFIDAVIT**

I swear under the pains and penalties of perjury that I am duly authorized by the bidder named below to sign and submit this Prime/General Contractor Update Statement on behalf of the bidder named below, that I have read this Prime/General Contractor Update Statement, and that all of the information provided by the bidder in this Prime/General Contractor Update Statement is true, accurate, and complete as of the bid date.

\_\_\_\_\_  
Bid Date

\_\_\_\_\_  
Print Name of Prime/General Contractor

\_\_\_\_\_  
Project Number (or  
name if no number)

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

\_\_\_\_\_  
Awarding Authority

\_\_\_\_\_  
Telephone Number

**SIGNATURE ⇨**

\_\_\_\_\_  
**Bidder's Authorized Representative**

# INSTRUCTIONS

## INSTRUCTIONS TO BIDDERS

- This form must be completed and submitted by all Prime/General contractors bidding on projects pursuant to M.G.L. c. 149, §44A and M.G.L. c. 149A.
- You must give complete and accurate answers to all questions and provide all of the information requested. **MAKING A MATERIALLY FALSE STATEMENT IN THIS UPDATE STATEMENT IS GROUNDS FOR REJECTING YOUR BID AND FOR DEBARRING YOU FROM ALL PUBLIC CONTRACTING.**
- **This Update Statement must include all requested information that was not previously reported on the Application used for your firm's most recently issued (not extended or amended) Prime/General Contractor Certificate of Eligibility. The Update Statement must cover the entire period since the date of your Application, NOT since the date of your Certification.**
- You must use this official form of Update Statement. Copies of this form may be obtained from the awarding authority and from the Asset Management Web Site: [www.mass.gov/dcam](http://www.mass.gov/dcam).
- If additional space is needed, please copy the appropriate page of this Update Statement and attach it as an additional sheet.
- See the section entitled "Bidding Limits" in the *Instructions to Awarding Authorities* for important information concerning your bidding limits.

## INSTRUCTIONS TO AWARDING AUTHORITIES

### ***Determination of Bidder Qualifications***

- It is the awarding authority's responsibility to determine who is the lowest eligible and responsible bidder. You must consider all of the information in the low bidder's Update Statement in making this determination. **Remember:** this information was not available to the Division of Capital Asset Management at the time of certification.
- The bidder's performance on the projects listed in Parts 1 and 2 must be part of your review. Contact the project references.
- **AWARDING AUTHORITIES ARE STRONGLY ENCOURAGED TO REVIEW THE LOW BIDDER'S ENTIRE CERTIFICATION FILE AT THE DIVISION OF CAPITAL ASSET MANAGEMENT. Telephone (617) 727-9320 for an appointment.**

### ***Bidding Limits***

**Single Project Limit:** The total amount of the bid, including all alternates, may not exceed the bidder's Single Project Limit.

**Aggregate Work Limit:** The annual value of the work to be performed on the contract for which the bid is submitted,

when added to the annual cost to complete the bidder's other currently held contracts, may not exceed the bidder's Aggregate Work Limit. Use the following procedure to determine whether the low bidder is within its Aggregate Work Limit:

**Step 1** Review Update Statement Question #2 to make sure that all requested information is provided and that the bidder has accurately calculated and totaled the annualized value of all incomplete work on its currently held contracts (column 9).

**Step 2** Determine the annual dollar value of the work to be performed on your project. This is done as follows:

- (i) If the project is to be completed in less than 12 months, the annual dollar value of the work is equal to the full amount of the bid.
- (ii) If the project will take more than 12 months to complete, calculate the number of years given to complete the project by dividing the total number of months in the project schedule by 12 (calculate to 3 decimal places), then divide the amount of the bid by the calculated number of years to find the annual dollar value of the work.

**Step 3** Add the annualized value of all of the bidder's incomplete contract work (the total of column 9 on page 5) to the annual dollar value of the work to be performed on your project. **The total may not exceed the bidder's Aggregate Work Limit.**

### ***Correction of Errors and Omissions in Update Statements***

**Matters of Form:** An awarding authority shall not reject a contractor's bid because there are mistakes or omissions of form in the Update Statement submitted with the bid, provided the contractor promptly corrects those mistakes or omissions upon request of the awarding authority. [810 CMR 8.05(1)].

**Correction of Other Defects:** An awarding authority may, in its discretion, give a contractor notice of defects, other than mistakes or omissions of form, in the contractor's Update Statement, and an opportunity to correct such defects, provided the correction of such defects is not prejudicial to fair competition. An awarding authority may reject a corrected Update Statement if it contains unfavorable information about the contractor that was omitted from the Update Statement filed with the contractor's bid. [810 CMR 8.05(2)].

**PART 1 - COMPLETED PROJECTS**

LIST ALL PUBLIC AND PRIVATE *BUILDING* PROJECTS YOUR FIRM HAS COMPLETED SINCE THE DATE OF APPLICATION FOR YOUR MOST RECENTLY ISSUED (NOT EXTENDED OR AMENDED) DCAM CERTIFICATE OF ELIGIBILITY. YOU MUST REPORT ALL REQUESTED INFORMATION NOT PREVIOUSLY REPORTED ON THAT DCAM APPLICATION\*.

PROJECT TITLE & LOCATION	WORK CATEGORY	CONTRACT PRICE	START DATE	DATE COMPLETED

Attach additional sheets if necessary

\* If your firm has been terminated from a project prior to completion of the work or has failed or refused to complete its work under any contract, full details and an explanation must be provided. See Part 3 of this Update Statement.

PROVIDE THE FOLLOWING REFERENCE INFORMATION FOR EACH COMPLETED PROJECT LISTED ON THE PREVIOUS PAGE.

PROJECT TITLE	COMPANY NAME	CONTACT PERSON	TELEPHONE
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone

Is your company or any individual who owns, manages or controls your company affiliated with any owner, designer or general contractor named above, either through a business or family relationship?  YES  NO

Are any of the contact persons named above affiliated with your company or any individual who owns, manages or control your company, either through a business or family relationship?  YES  NO

If you have answered YES to either question, explain. \_\_\_\_\_



**PART 2 - CURRENTLY HELD CONTRACTS**

LIST ALL PUBLIC AND PRIVATE BUILDING AND NON-BUILDING *CONSTRUCTION* PROJECTS YOUR FIRM HAS UNDER CONTRACT ON THIS DATE REGARDLESS OF WHEN OR WHETHER THE WORK COMMENCED.

1	2	3	4	5	6	7	8	9
PROJECT TITLE & LOCATION	WORK CATEGORY	START AND END DATES	ON SCHEDULE (yes / no)	CONTRACT PRICE	% NOT COMPLETE	\$ VALUE OF WORK NOT COMPLETE (col. 5 X col. 6)	NO. OF YEARS REMAINING (see note below)	ANNUALIZED VALUE OF INCOMPLETE WORK (col. 7 ÷ col. 8) (divided by)

ANNUALIZED VALUE OF ALL INCOMPLETE CONTRACT WORK (Total of Column 9)

\$ \_\_\_\_\_

Column 8

- If less than one year is left in the project schedule, write 1.
- If more than 12 months are left in the project schedule, divide the number of months left in the project schedule by 12 (calculate to three decimal places).

PROVIDE THE FOLLOWING REFERENCE INFORMATION FOR EACH INCOMPLETE PROJECT LISTED ON THE PREVIOUS PAGE.

PROJECT TITLE	COMPANY NAME	CONTACT PERSON	TELEPHONE
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone
	OWNER: Owner	Contact Person	Telephone
	DESIGNER: Designer	Contact Person	Telephone
	GC: GC	Contact Person	Telephone

Is your company or any individual who owns, manages or controls your company affiliated with any owner, designer or general contractor named above either through a business or family relationship?  YES  NO

Are any of the contact persons named above affiliated with your company or any individual who owns, manages or control your company, either through a business or family relationship?  YES  NO

If you have answered YES to either question, explain. \_\_\_\_\_

### PART 3 - PROJECT PERFORMANCE

For Parts 3 and 4, if you answer YES to any question, please provide on a separate page a complete explanation. Information you provide herein must supplement the Application for your most recently issued (not extended or amended) DCAM Certificate of Eligibility. You must report all requested information not previously reported on that DCAM Application for Prime/General Certificate of Eligibility. Include all details [project name(s) and location(s), names of all parties involved, relevant dates, etc.].

	YES	NO
1. Has your firm been terminated on any contract prior to completing a project or has any officer, partner or principal of your firm been an officer, partner or principal of another firm that was terminated or failed to complete a project?	<input type="checkbox"/>	<input type="checkbox"/>
2. Has your firm failed or refused either to perform or complete any of its work under any contract prior to substantial completion?	<input type="checkbox"/>	<input type="checkbox"/>
3. Has your firm failed or refused to complete any punch list work under any contract?	<input type="checkbox"/>	<input type="checkbox"/>
4. Has your firm filed for bankruptcy, or has any officer, principal or individual with a financial interest in your current firm been an officer, principal or individual with a financial interest in another firm that filed for bankruptcy?	<input type="checkbox"/>	<input type="checkbox"/>
5. Has your surety taken over or been asked to complete any of your work under any contract?	<input type="checkbox"/>	<input type="checkbox"/>
6. Has a payment or performance bond been invoked against your current firm, or has any officer, principal or individual with a financial interest in your current firm been an officer, principal or individual with a financial interest in another firm that had a payment or performance bond invoked?	<input type="checkbox"/>	<input type="checkbox"/>
7. Has your surety made payment to a materials supplier or other party under your payment bond on any contract?	<input type="checkbox"/>	<input type="checkbox"/>
8. Has any subcontractor filed a demand for direct payment with an awarding authority for a public project on any of your contracts?	<input type="checkbox"/>	<input type="checkbox"/>
9. Have any of your subcontractors or suppliers filed litigation to enforce a mechanic's lien against property in connection with work performed or materials supplied under any of your contracts?	<input type="checkbox"/>	<input type="checkbox"/>
10. Have there been any deaths of an employee or others occurring in connection with any of your projects?	<input type="checkbox"/>	<input type="checkbox"/>
11. Has any employee or other person suffered an injury in connection with any of your projects resulting in their inability to return to work for a period in excess of one year?	<input type="checkbox"/>	<input type="checkbox"/>

**PART 4 - Legal or Administrative Proceedings; Compliance with Laws**

**Please answer the following questions. Information must supplement all judicial and administrative proceedings involving bidder’s firm, which were instituted or concluded (adversely or otherwise) since your firm’s Application for your most recently issued (not extended or amended) Certificate of Eligibility. You must report all requested information not previously reported on that DCAM Application for Prime/General Certificate of Eligibility.**

The term “administrative proceeding” as used in this Prime/General Contractor Update Statement includes (i) any action taken or proceeding brought by a governmental agency, department or officer to enforce any law, regulation, code, legal, or contractual requirement, except for those brought in state or federal courts, or (ii) any action taken by a governmental agency, department or officer imposing penalties, fines or other sanctions for failure to comply with any such legal or contractual requirement.

The term “anyone with a financial interest in your firm” as used in this Section “I”, shall mean any person and/or entity with a 5% or greater ownership interest in the applicant’s firm.

**If you answer YES to any question, on a separate page provide a complete explanation of each proceeding or action and any judgment, decision, fine or other sanction or result. Include all details (name of court or administrative agency, title of case or proceeding, case number, date action was commenced, date judgment or decision was entered, fines or penalties imposed, etc.).**

	YES	NO
1. Have any civil, judicial or administrative proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to the procurement or performance of any construction contract, including but not limited to actions to obtain payment brought by subcontractors, suppliers or others?	<input type="checkbox"/>	<input type="checkbox"/>
2. Have any criminal proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to the procurement or performance of any construction contract including, but not limited to, any of the following offenses: fraud, graft, embezzlement, forgery, bribery, falsification or destruction of records, or receipt of stolen property?	<input type="checkbox"/>	<input type="checkbox"/>
3. Have any judicial or administrative proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to a violation of any state’s or federal procurement laws arising out of the submission of bids or proposals?	<input type="checkbox"/>	<input type="checkbox"/>
4. Have any judicial or administrative proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to a violation of M.G.L. Chapter 268A, the State Ethics Law?	<input type="checkbox"/>	<input type="checkbox"/>

**PART 4 - Legal or Administrative Proceedings; Compliance with Laws (continued)**

	YES	NO
5. Have any judicial or administrative proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to a violation of any state or federal law regulating hours of labor, unemployment compensation, minimum wages, prevailing wages, overtime pay, equal pay, child labor or worker's compensation?	<input type="checkbox"/>	<input type="checkbox"/>
6. Have any judicial or administrative proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to a violation of any state or federal law prohibiting discrimination in employment?	<input type="checkbox"/>	<input type="checkbox"/>
7. Have any judicial or administrative proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to a claim of repeated or aggravated violation of any state or federal law regulating labor relations?	<input type="checkbox"/>	<input type="checkbox"/>
8. Have any proceedings by a municipal, state, or federal agency been brought, concluded, or settled relating to decertification, debarment, or suspension of your firm or any principal or officer or anyone with a financial interest in your firm from public contracting?	<input type="checkbox"/>	<input type="checkbox"/>
9. Have any judicial or administrative proceedings involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled relating to a violation of state or federal law regulating the environment?	<input type="checkbox"/>	<input type="checkbox"/>
10. Has your firm been fined by OSHA or any other state or federal agency for violations of any laws or regulations related to occupational health or safety? Note: this information may be obtained from OSHA's Web Site at <a href="http://www.osha.gov">www.osha.gov</a>	<input type="checkbox"/>	<input type="checkbox"/>
11. Has your firm been sanctioned for failure to achieve DBE/MBE/WBE goals, workforce goals, or failure to file certified payrolls on any public projects?	<input type="checkbox"/>	<input type="checkbox"/>
12. Other than previously reported in the above paragraphs of this Section I, have any administrative proceedings or investigations involving your firm or a principal or officer or anyone with a financial interest in your firm been brought, concluded, or settled by any local, state or federal agency relating to the procurement or performance of any construction contract?	<input type="checkbox"/>	<input type="checkbox"/>
13. Are there any other issues that you are aware which may affect your firm's responsibility and integrity as a building contractor?	<input type="checkbox"/>	<input type="checkbox"/>

**PART 5 - SUPERVISORY PERSONNEL**

List all supervisory personnel, such as project managers and superintendents, who will be assigned to the project if your firm is awarded the contract. **Attach the resume of each person listed below.**

NAME	TITLE OR FUNCTION

**PART 6 - CHANGES IN BUSINESS ORGANIZATION OR FINANCIAL CONDITION**

Have there been any changes in your firm’s business organization, financial condition or bonding capacity since the date your current Certificate of Eligibility was issued?  Yes  No  
**If YES, attach a separate page providing complete details.**

**PART 7 – LIST OF COMPLETED CONSTRUCTION PROJECTS SUBMITTED TO THE DIVISION OF CAPITAL ASSET MANAGEMENT.**

**Attach here a copy of the list of completed construction projects which was submitted with your firm’s DCAM Application for your most recently issued (not extended or amended) DCAM Certificate of Eligibility. The Attachment must include a complete copy of the entire Section G – “Completed Projects” and the final page – “Certification” (Section J) containing the signature and date that the Completed Projects list (Section G) was submitted to the Division of Capital Asset Management.**

**OSHA GENERAL CONTRACTOR CERTIFICATION FORM**

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

**GENERAL CONTRACTOR'S CERTIFICATION - BID FORM**

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

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

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

Signature: \_\_\_\_\_  
(Individual Submitting Bid)  
Duly Authorized

Name of Business or Entity: \_\_\_\_\_

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

**INSURANCE REQUIREMENTS (CERTIFICATES TO BE SUBMITTED POST AWARD)**

The Vendor/Contractor shall maintain in full force and effect during the duration of this contract insurance issued by companies qualified to do business in the Commonwealth of Massachusetts, as follows:

- a) COMMERCIAL GENERAL LIABILITY, in primary amounts not less than:

\$2,000,000.00 per occurrence

\$2,000,000.00 aggregate

- b) AUTOMOBILE LIABILITY, including the use of all vehicles owned, leased, hired or borrowed, with limits not less than \$2,000,000.00 combined single limit covering work performed under this contract.
- c) WORKER'S COMPENSATION, statutory coverage as provided by General Laws, Chapter 152, as amended.

The Vendor/Contractor shall deposit with Town certificates of insurance for such coverage in form and substance satisfactory to the Town, **naming the Town of Ayer as an additional insured**, and shall deliver to the Town new policies or certificates thereof for any insurance about to expire at least ten (10) days before such expiration. The Vendor/Contractor shall furnish the Town with the name and telephone number of the insurance agent and with copies of the insurance policies and endorsements. The Vendor/Contractor shall submit all changes or alterations in the policies to the Town for its approval.

**Certificate Should Be Made Out To:**

**Town of Ayer  
One Main Street  
Ayer, MA 01432**

**Note: If your insurance expires during the life of this contract, you shall be responsible to submit a new certificate(s) covering the period of the contract. No payment will be made on a contract with an expired insurance certificate**



# Appendix C

## Price Proposal Forms



**PRE-ENGINEERED CONSTRUCTION PRICE PROPOSAL FORM**

To the Town of Ayer (Awarding Authority):

A. The undersigned proposes to furnish all labor and materials required for the Design, Prefabrication, Site Assembly/Installation, and all services required to complete and deliver a pre-engineered building at the Grove Pond Water Treatment Plant (Project) in Ayer, Massachusetts, in accordance with the accompanying Construction Document Drawings and Specifications prepared by \_\_\_\_\_ for the contract price specified below.

B. This base bid proposal includes addenda numbered \_\_\_\_ through \_\_\_\_.

C. The price proposed contract price is:

\_\_\_\_\_ dollars \$ \_\_\_\_\_  
 (total base bid proposal in words) (figures)

D. Add Alternate Items: In addition to the aforementioned Base Bid and the below Deduct Alternate Items, the Bidder shall provide prices for the following Add Alternate Items that the Owner, at the Owner's sole discretion, may add to the Base Bid in ascending order below (i.e. add alternate Item No. 1, then Item No. 2, etc.). If the Owner elects to Add Alternate Items, the price shall be added to the base bid price to determine the lowest responsible and eligible bidder:

ADD ALTERNATE ITEM NO.	DESCRIPTION	TOTAL
1.	Add Alternate 1 includes furnishing and installing two 23'-10" wide Garage Bay Doors in lieu of one 23'-10" and one 13'-10" Garage Bay Doors shown on the Drawings	\$

E. Deduct Alternate Items: In addition to the aforementioned Base Bid and Add Alternate Items, the Bidder shall provide prices for the following Deduct Alternate Items that the Owner, at the Owner's sole discretion, may deduct from the Base Bid in ascending order below (i.e. deduct alternate Item No. 1, then Item No. 2, etc.). If the Owner elects to Deduct Alternate Items, the price shall be deducted from the base bid price to determine the lowest responsible and eligible bidder:

DEDUCT ALTERNATE ITEM NO.	DESCRIPTION	TOTAL
1.	Deduct Alternate 1 includes the removal of Electrical and HVAC components from the Work as shown on Drawings M100, M101, M200, E001, and E100, and specified in the "HVAC Systems Performance Specifications" and the "Electrical Systems Performance Specifications"	\$

F. The undersigned submits along with this Price Proposal Form a proposal deposit equal to five percent (5%) of the total contract price, considering all allowances, payable to the Town of Ayer is attached in the form of certified check, treasurer's check issued by a responsible, bank or trust company, or bid bond issued by a surety company licensed to do business in the Commonwealth of Massachusetts.

The undersigned further certifies under the penalty of perjury that this bid/proposal is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection, the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F (29F) of chapter twenty-nine (29), or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date \_\_\_\_\_

\_\_\_\_\_  
(Company Name of Proposer)

By \_\_\_\_\_  
(Signature of Authorized Signatory)

\_\_\_\_\_  
(Print Name & Title of Person Signing Proposal)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
(City, State and Zip Code)

\_\_\_\_\_  
(Telephone Number & Fax Number)

\_\_\_\_\_  
(E-mail address)

\* If a foreign corporation, the undersigned is registered to do business in Massachusetts required under M.G.L. c30 §39L and will obtain from the Secretary of State, Foreign Corporation Section, State House, Boston, MA, a certificate stating that our corporation is registered; and furnish said certificate to the Town of Ayer as the Awarding Authority prior to execution of a contract.

# BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER:  
Town of Ayer  
One Main Street  
Ayer, MA 01432

BID  
Bid Due Date: July 29, 2016 1:00 P.M.  
Project (Brief Description Including Location):  
Pre-engineered Garage at Grove Pond Water Treatment Plant

BOND  
Bond Number: \_\_\_\_\_  
Date (Not later than Bid due date): \_\_\_\_\_  
Penal sum \_\_\_\_\_  
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

\_\_\_\_\_  
(Seal)  
Bidder's Name and Corporate Seal

\_\_\_\_\_  
(Seal)  
Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature and Title

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

Attest: \_\_\_\_\_  
Signature and Title

Attest: \_\_\_\_\_  
Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
  - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2. All Bids are rejected by Owner, or
  - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

# Appendix D

## Schematic Plans

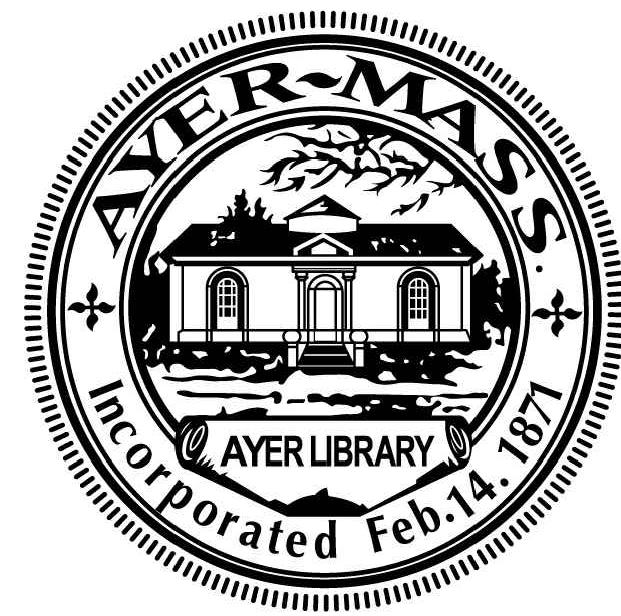
# TOWN OF AYER, MASSACHUSETTS

## SCHEMATIC DESIGN DRAWINGS FOR

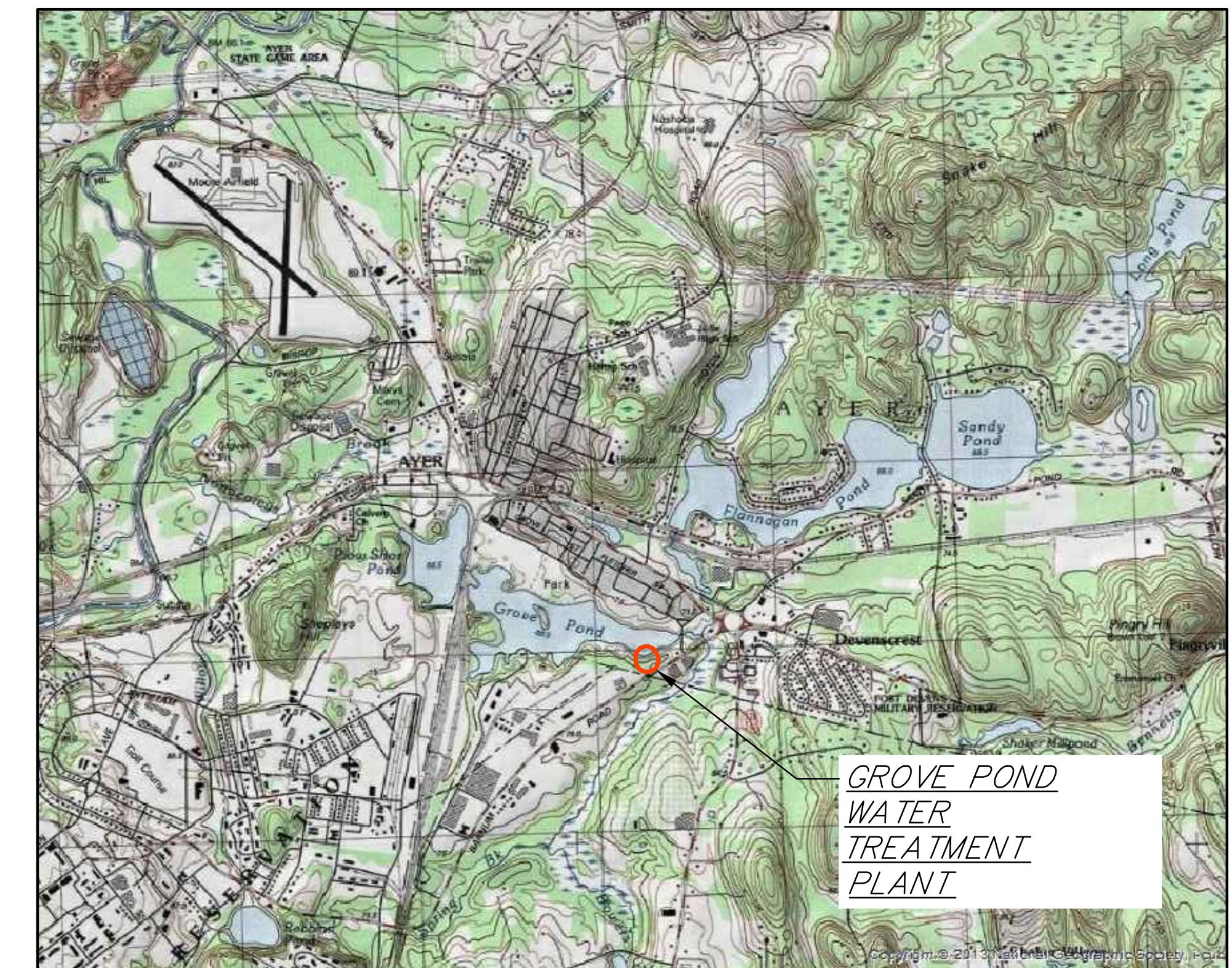
# PRE-ENGINEERED GARAGE AT THE

# GROVE POND WATER TREATMENT PLANT

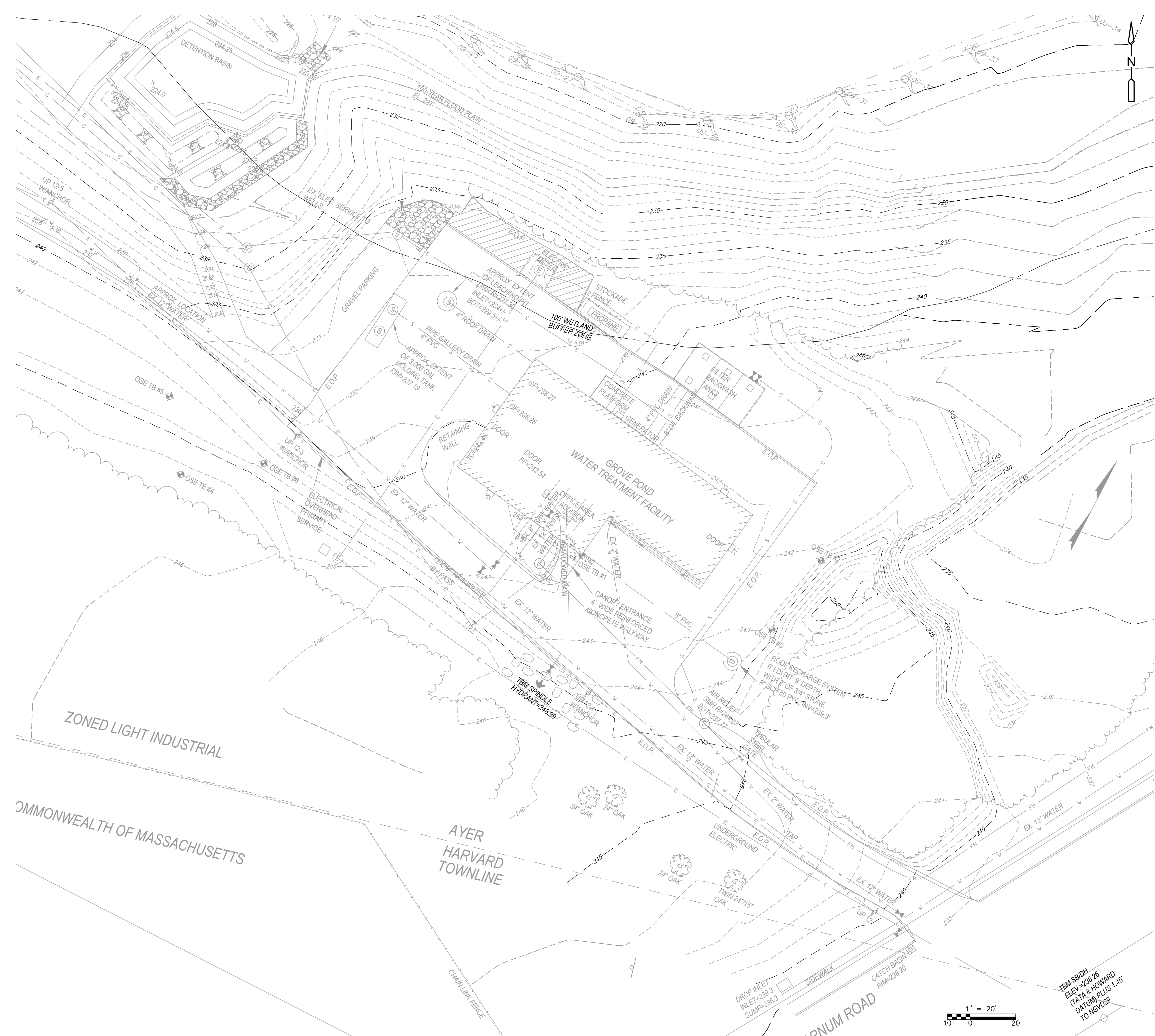
JUNE 2016



<u>DRAWING</u>	<u>TITLE</u>
-	COVER SHEET
C100	EXISTING CONDITIONS PLAN
C200	SITE PLAN
C300	CIVIL DETAILS
A100	PLANS & CODE SUMMARY
A200	ELEVATIONS AND SECTIONS
A300	DOOR SCHEDULE AND DETAILS
P100	PLUMBING PLAN & NOTES
S100	FOUNDATION PLAN & TYPICAL DETAILS
S200	GENERAL NOTES & TYPICAL DETAILS
S300	TYPICAL DETAILS
M100	MECHANICAL LEGENDS AND SCHEDULES
M200	MECHANICAL DETAILS AND SEQUENCES
M300	MECHANICAL FLOOR PLAN
E001	ELECTRICAL LEGEND AND NOTES
E002	ELECTRICAL NEW WORK PLANS



LOCATION PLAN  
SCALE: 1"=2,000'



**EXISTING FEATURES LEGEND**

DESCRIPTION	SYMBOL
WATER MAIN	—
WATER GATE VALVE	—
REDUCER	—
TRANSITION COUPLING	—
CAP	—
CROSS	—
TEE	—
BEND	—
CURB STOP	—
SOLID SLEEVE	—
FIRE HYDRANT	—
WATER SERVICE LINE	—
WELL	—
ZONE 1	—
SEWER MANHOLE	—
SEWER GRAVITY MAIN	—
SEWER FORCE MAIN	—
DRAIN MANHOLE	—
CATCH BASIN	—
DRAIN LINE	—
RIP RAP	—
FLARED DRAINAGE PIPE	—
COMM. BOX	—
COMM. LINE	—
COMM. MANHOLE	—
ELECTRIC LINE	—
ELECTRIC MANHOLE	—
ELECTRIC OVERHEAD WIRE	—
TRANSFORMER	—
UTILITY POLE	—
GUY WIRE	—
LIGHT WALL MOUNT / POLE	—
GAS LINE	—
GAS VALVE	—
MISC. MANHOLE	—
TREE LINE	—
TREE	—
SHRUB	—
ROCK	—
WETLANDS	—
WETLAND FLAG	—
100-FT WETLAND BUFFER	—
EDGE OF WATER	—
RIVER FRONT	—
100 YEAR FEMA FLOOD ZONE	—
HAYBALES	—
SILTATION FENCE	—
LIMIT OF WORK	—
5' CONTOUR	—
1' CONTOUR	—
SPOT ELEVATION	—
BORING	—
MONITORING WELL	—
EASEMENT	—
SURVEY MARKER	—
STATIONING	—
TOWN LINE	—
CHAIN LINK FENCE	—
STONE WALL	—
GUARD RAIL	—
BOLLARD	—
MAIL BOX	—
SIGN POST	—
EDGE OF PAVEMENT	—
PROPERTY LINE	—

**ABBREVIATIONS**

HYD	HYDRANT
RCP	REINFORCED CONCRETE PIPE
DI	DUCTILE IRON
AC	ASBESTOS CONCRETE
CI	CAST IRON
WI	WROUGHT IRON
CLAY	VITRIFIED CLAY
PVC	POLYVINYL CHLORIDE
TYP	TYPICAL
PB	PULL BOX
IRR	IRRIGATION SYSTEM AREA
TCB	TRAFFIC CONTROL BOX
TRAN	TRANSFORMER
TRLT	TRAFFIC LIGHT
FM	FORCE MAIN
LDET	LOOP DETECTOR
CDF	CONTROLLED DENSITY FILL
CB	CATCH BASIN
DMH	DRAIN MANHOLE
SMH	SEWER MANHOLE
CONC	CONCRETE
BIT	BITUMINOUS
BLDG	BUILDING
DIA	DIAMETER
EX	EXISTING
ID	INNER DIAMETER
OD	OUTER DIAMETER
BFV	BUTTERFLY VALVE
GV	GATE VALVE

**GENERAL NOTES:**

- CONTACT "DIG SAFE" AT 1-888-344-7233, 72 HOURS PRIOR TO ANY EXCAVATION AND/OR SUBSURFACE TESTING TO INFORM THE UTILITY COMPANIES OF ANY EXCAVATION.
- THE LOCATION AND ELEVATION OF ANY EXISTING UTILITIES SHALL BE CONSIDERED APPROXIMATE AND MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION. UNDERGROUND UTILITIES SHOWN ARE FROM THE BEST AVAILABLE RECORD INFORMATION AND ARE NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL UNDERGROUND PIPES AND STRUCTURES ARE SHOWN.
- THE PROPERTY IS PARTIALLY LOCATED WITHIN 100-YEAR FLOOD ZONES X, A AND AE AS DETERMINED BY MIDDLESEX COUNTY FEMA MAP 25017C0212E, PANEL 212 OF 656, JUNE 4, 2010.
- ELEVATION DATUM BENCHMARK SHOWN ON FIRE HYDRANTS LOCATED AT WATER TREATMENT FACILITY AND STONE BOUND ON BARNUM ROAD.

**SURVEY NOTES:**

- SURVEY, WETLAND FLAGS, AND PUBLIC WELL ZONE 1 PROVIDED BY DAVID ROSS ASSOCIATES BASE PLAN, DATED MAY 2010, AUGUST 2008, AND AYER DPW FIELD VERIFICATION. ONLY THOSE FEATURES AND UTILITIES VISIBLE AT THE TIME OF SURVEY ARE DEPICTED ON THIS PLAN. TOPOGRAPHY PERFORMED IN SNOW COVER. LOCATION OF UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE AND ALL UNDERGROUND UTILITY LOCATIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION.
- ELEVATIONS REFER TO VERTICAL DATUM NGVD 1929.

CERTIFICATION:

STATUS:

ENGINEER:



Ayer DPW  
25 Brook Street  
Ayer, Massachusetts

REVISIONS:

MARK	DATE	DESCRIPTION

PROJECT:

PRE-ENGINEERED GARAGE  
AT GROVE POND WATER  
TREATMENT PLANT

FILE NAME:  
S:\1-PROJECTS\Garages - Parks and  
Water Depts\Water\Figures\C-1 Site  
Plan and Details.DWG  
AUTHOR: DAN VAN SCHALKWYK, P.E.  
DRAFTER: DAN VAN SCHALKWYK, P.E.  
CHECKED BY: MARK WETZEL, P.E.  
DATE: JUNE 2016

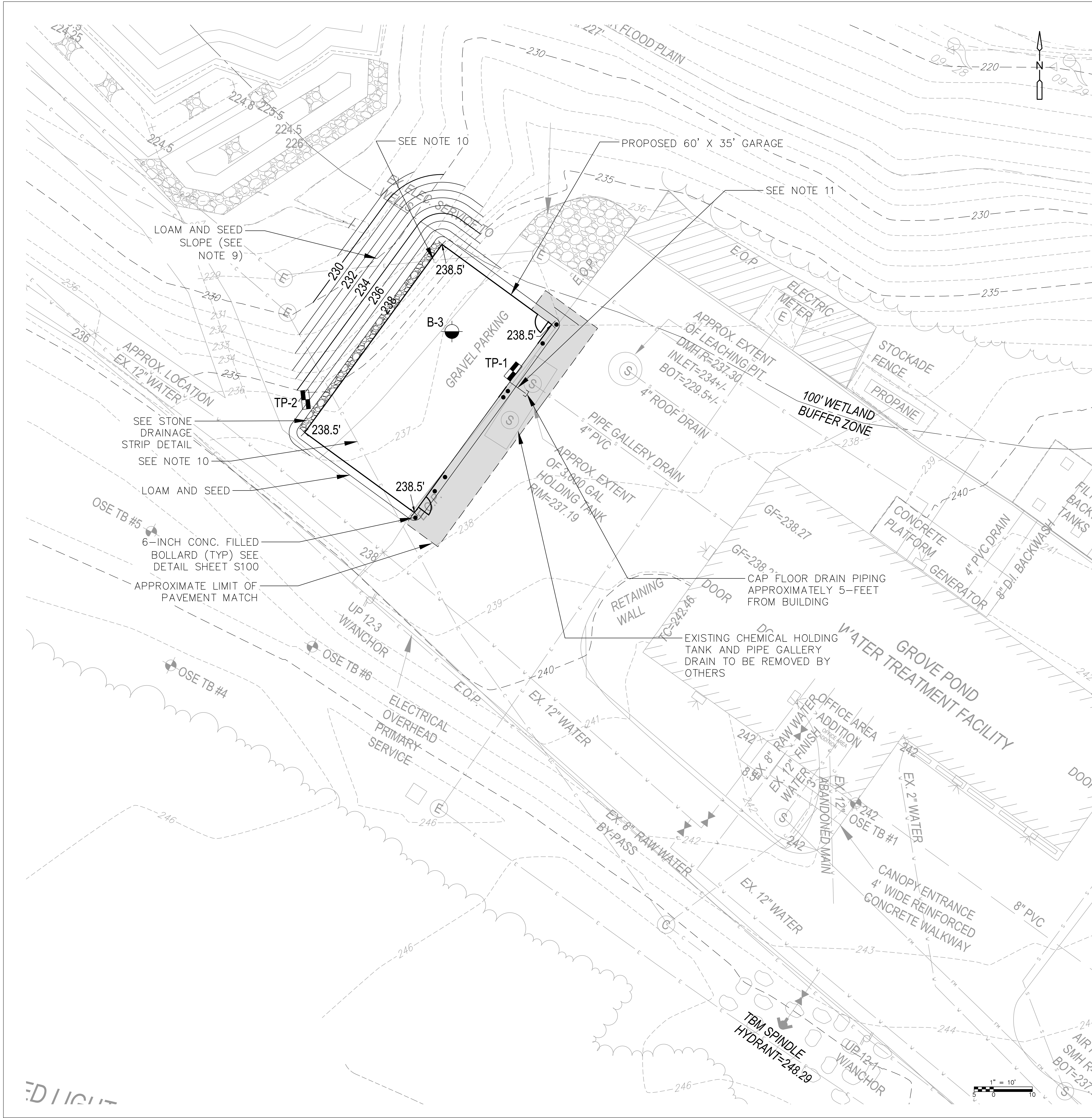
SHEET TITLE:  
EXISTING  
CONDITIONS  
PLAN

SHEET:

C100

SCHEMATIC DESIGN –  
NOT FOR  
CONSTRUCTION





**PROPOSED FEATURES LEGEND**

- SPOT ELEVATION  $\times 238.25'$
- ASPHALT AREAS
- PROPOSED 5' CONTOUR
- PROPOSED 1' CONTOUR
- APPROXIMATE TEST PIT LOCATION
- APPROXIMATE SOIL BORING LOCATION

**GENERAL NOTES:**

1. ALL SPECIFICATION SECTION DIVISION 2 SITE WORK SHALL BE DONE IN ACCORDANCE WITH THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES (1995), INCLUDING ALL SUPPLEMENTAL SPECIFICATIONS. IN THE EVENT THERE IS A CONFLICT BETWEEN THE STANDARD SPECIFICATIONS AND THE SUPPLEMENTAL SPECIFICATIONS, THE MORE STRINGENT STANDARD SHALL APPLY.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ALL SPOIL/EXCESS MATERIAL FROM THE SITE.
3. ALL DISTURBED AREAS NOT PROPOSED TO BE IMPROVED SHALL BE RESTORED TO THEIR PRIOR CONDITION, EITHER PAVEMENT, GRAVEL, OR 4-INCH LOAM AND SEED.
4. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL AND HVAC INFORMATION.
5. SANITARY SEWER, WATER, AND GAS ARE NOT PROPOSED AS PART OF THIS PROJECT.
6. ALL DISPOSAL OF DEMOLITION DEBRIS OR WASTES SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS. CONTRACTOR SHALL PROVIDE OWNER WITH APPROPRIATE "BILLS OF LADING" DEMONSTRATING PROPER DISPOSAL OF ALL MATERIALS.
7. REFER TO UTILITY TRENCH PAVEMENT PATCH DETAIL ON SHEET C-3 FOR UTILITY SURFACE RESTORATION.
8. CONTRACTOR TO VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONNECTING NEW SERVICES.
9. CONTRACTOR SHALL GRADE (SLOPE) GROUND AWAY FROM BUILDING FOR 2 FEET AT A MINIMUM OF 2.0% TO CONVEY WATER AWAY FROM BUILDING. GROUND SHALL THEN BE GRADED AT A MAXIMUM UP OR DOWN SLOPE OF 2:1 (H:V) AS NECESSARY TO MEET EXISTING GRADE UNLESS OTHERWISE APPROVED BY THE ENGINEER.
10. UTILITY LOCATIONS SHOWN ARE APPROXIMATE. FIELD CONFIRM LOCATION AND DEPTH OF UTILITIES SHOWN WITHIN BUILDING FOOTPRINT PRIOR TO CONSTRUCTION OF BUILDING FOUNDATION.

**SURVEY NOTES:**

1. SURVEY, WETLAND FLAGS, AND PUBLIC WELL ZONE I PROVIDED BY DAVID ROSS ASSOCIATES BASE PLAN, DATED MAY 2010, AUGUST 2008, AND AYER DPW FIELD VERIFICATION. ONLY THOSE FEATURES AND UTILITIES VISIBLE AT THE TIME OF SURVEY ARE DEPICTED ON THIS PLAN. TOPOGRAPHY PERFORMED IN SNOW COVER. LOCATION OF UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE AND ALL UNDERGROUND UTILITY LOCATIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION.
2. ELEVATIONS REFER TO VERTICAL DATUM NGVD 1929.

CERTIFICATION:

STATUS:

ENGINEER:

Ayer DPW  
25 Brook Street  
Ayer, Massachusetts

REVISIONS:

MARK	DATE	DESCRIPTION

PROJECT:

PRE-ENGINEERED GARAGE AT GROVE POND WATER TREATMENT PLANT

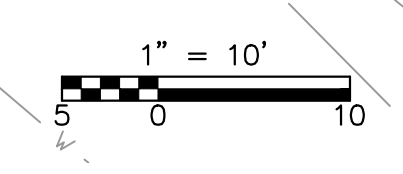
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 AUTHOR: DAN VAN SCHALKWYK, P.E.  
 DRAFTER: DAN VAN SCHALKWYK, P.E.  
 CHECKED BY: MARK WETZEL, P.E.  
 DATE: JUNE 2016  
 SHEET TITLE:

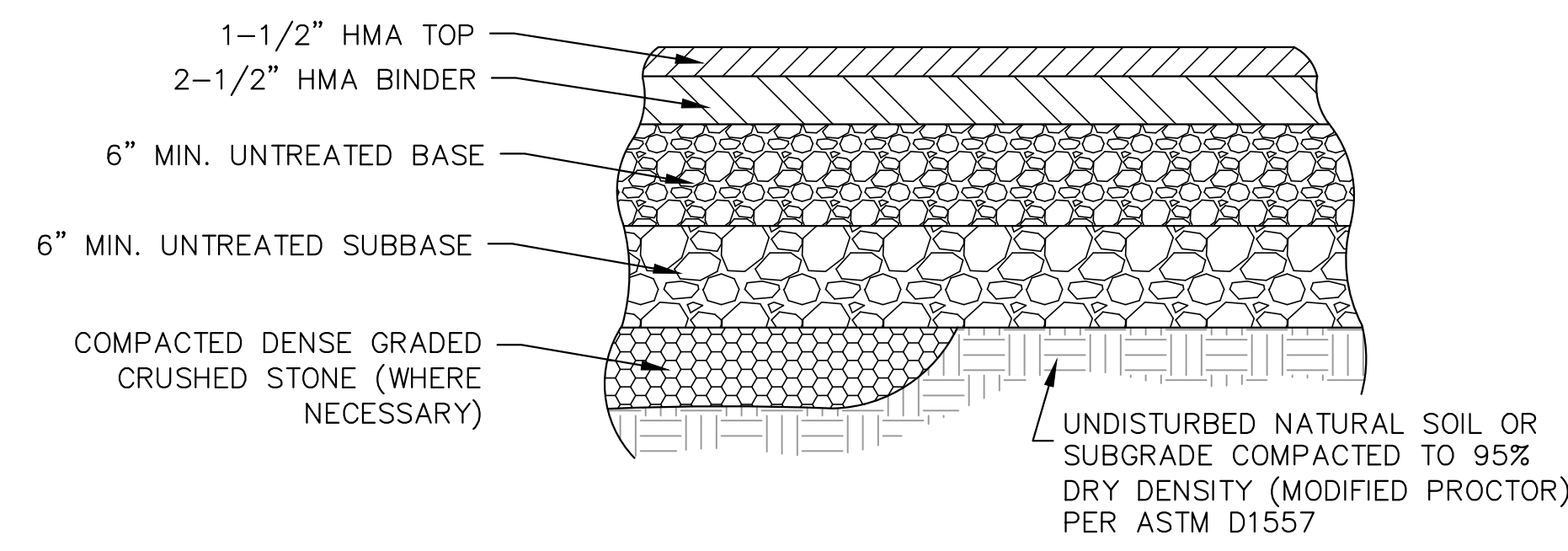
SITE PLAN

SHEET:

C200

SCHMATIC DESIGN –  
NOT FOR  
CONSTRUCTION

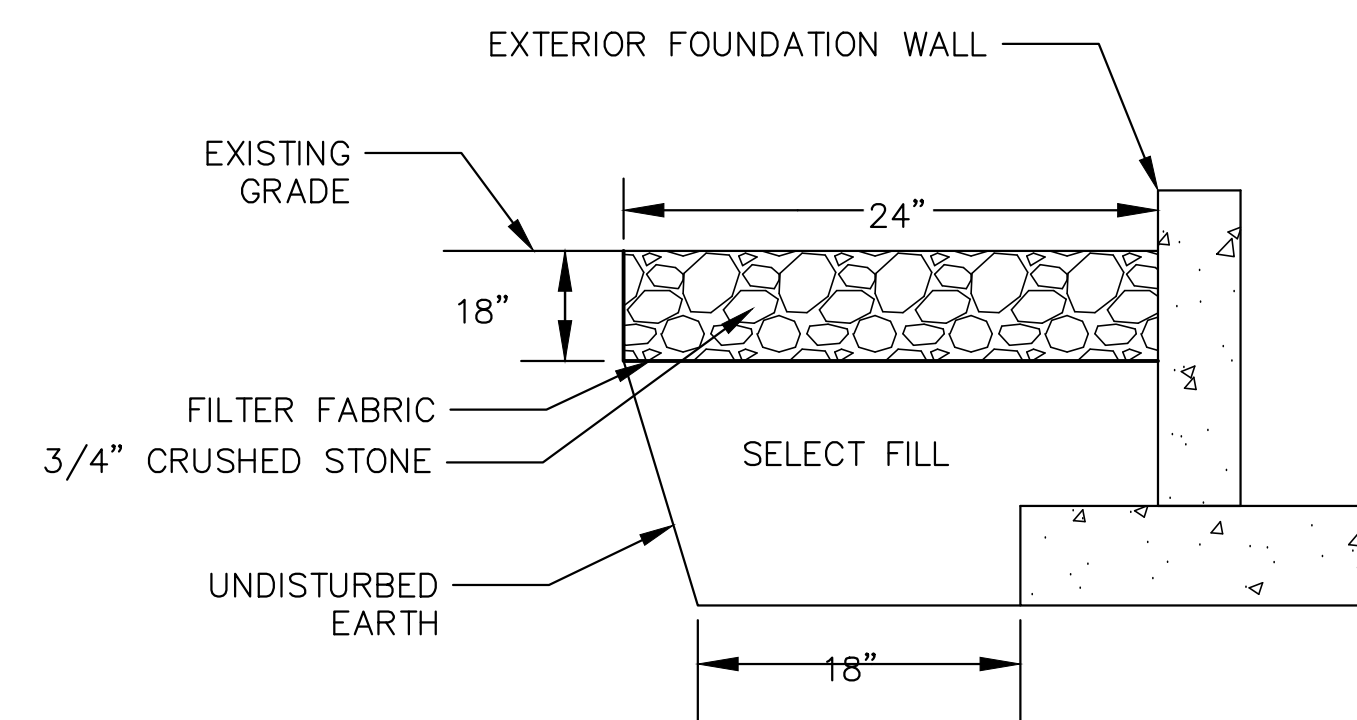




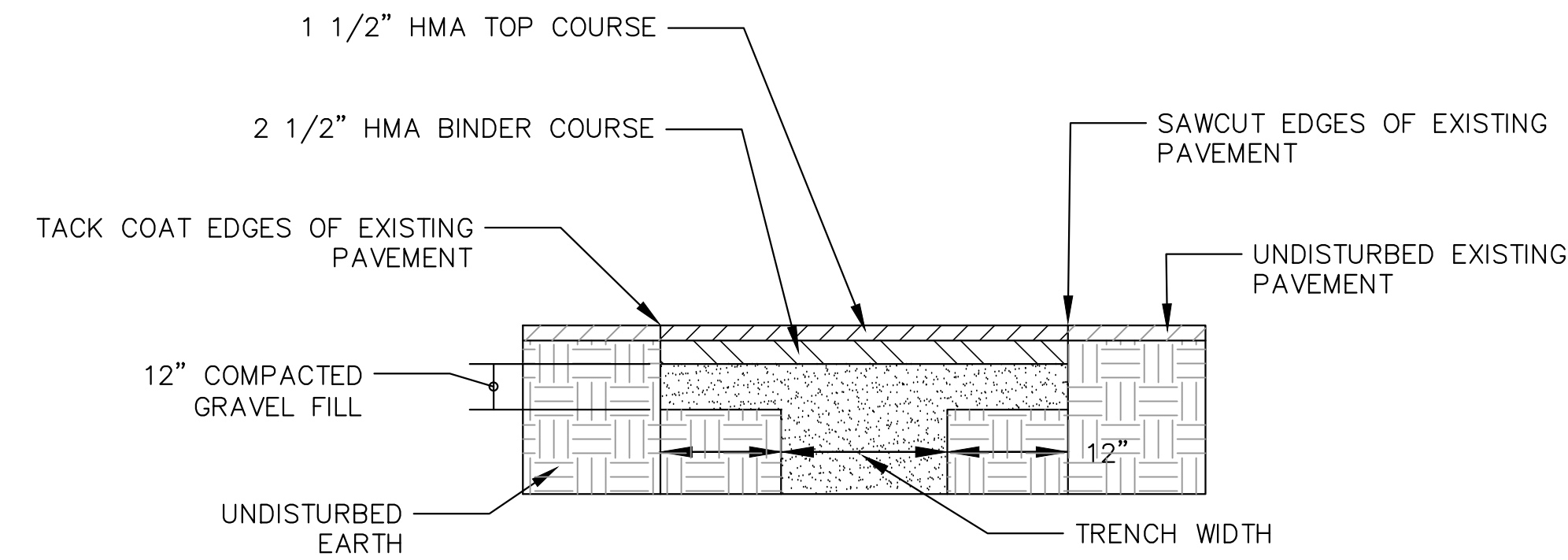
COURSE	MATERIAL	SPECIFICATION PER MASS HIGHWAY DEPARTMENT	MAX. AGG. SIZE (INCH)	COMPACTION REQUIREMENTS	
				COMPACTION	TEST DESIGNATION
TOP	BITUMINOUS CONCRETE	M3.11.03 CLASS I, TYPE I-1	1/2	[NOTE 1]	AASHTO-T166
BINDER	BITUMINOUS CONCRETE	M3.11.03 CLASS I, TYPE I-1	3/4	[NOTE 1]	AASHTO-T166
BASE	GRAVEL BORROW	M2.01.7	2	95% [NOTE 3]	ASTM D1557/AASHTO-T99
SUBBASE	GRAVEL BORROW	M1.03.0 TYPE B	3	95% [NOTE 3]	ASTM D1557/AASHTO-T99
SUBGRADE	ORDINARY BORROW	M1.01.0 [SEE NOTE 2]	8	95% [NOTE 3]	ASTM D1557/AASHTO-T99

NOTES:  
 [1] COMPACT TO TEST AVERAGE OF 95% TEST SHALL NOT BE LOWER THAN 93%.  
 [2] UNSUITABLE MATERIAL IN THE SUBGRADE SHALL BE REMOVED AND REPLACED WITH AN ACCEPTABLE SUBSTITUTE MATERIAL: 3/4" MINUS DENSE GRADED CRUSHED STONE.  
 [3] MATERIAL SHALL BE SPREAD AND COMPACTED IN LAYERS NOT EXCEEDING 8-INCHES IN DEPTH, COMPACTED MEASUREMENT; LAST LAYER OF MATERIAL SHALL NOT EXCEED 4-INCHES IN DEPTH, COMPACTED MEASUREMENT.

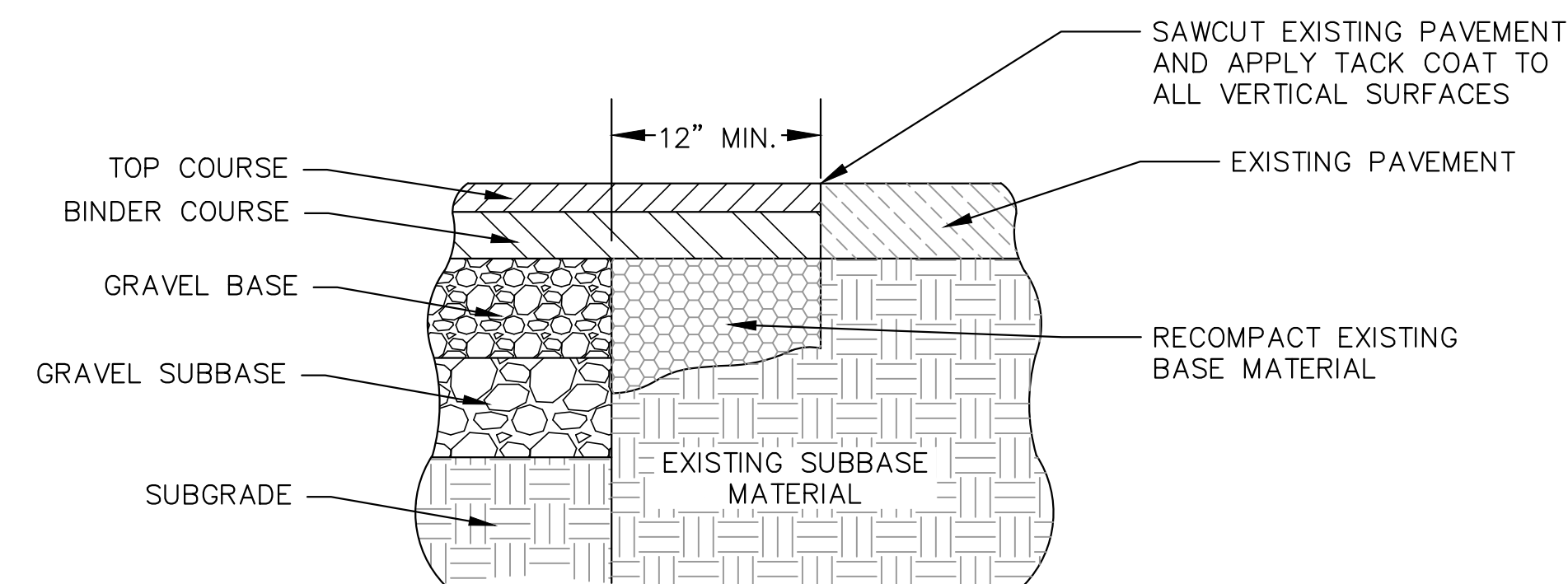
**BITUMINOUS CONCRETE PAVING**  
 TYPICAL CROSS SECTION  
 N.T.S.



**STONE DRAINAGE STRIP DETAIL**  
 NTS



**UTILITY TRENCH PAVEMENT PATCH DETAIL**  
 TYPICAL CROSS SECTION  
 N.T.S.



NOTES:  
 1. FLEXIBLE PAVEMENT REMOVAL SHALL BE INITIATED BY MAKING A FULL-DEPTH VERTICAL SAWCUT AT THE LOCATIONS INDICATED ON THE PLANS. SAWCUTS SHALL BE ACCOMPLISHED USING A STANDARD DIAMOND-TYPE BLADE SAW.  
 2. IF SAWCUT IS WITHIN THREE (3) FEET OF AN EXISTING BUILDING, CURB LINE OR EXISTING FENCE, COMPLETELY REMOVE EXISTING PAVEMENT AND REPLACE ACCORDING TO THE REQUIREMENTS OF BITUMINOUS CONCRETE PAVEMENT SECTION.

**PAVEMENT SAWCUT**  
 NTS

CERTIFICATION:

STATUS:

ENGINEER:



Ayer DPW  
 25 Brook Street  
 Ayer, Massachusetts

REVISIONS:

MARK	DATE	DESCRIPTION

PROJECT:

PRE-ENGINEERED GARAGE  
 AT GROVE POND WATER  
 TREATMENT PLANT

FILE NAME:  
 S:\1-PROJECTS\Garages - Parks and  
 Water Depts\Water\Figures\C-1 Site  
 Plan and Details.DWG  
 AUTHOR: DAN VAN SCHALKWYK, P.E.  
 DRAFTER: DAN VAN SCHALKWYK, P.E.  
 CHECKED BY: MARK WETZEL, P.E.  
 DATE: JUNE 2016  
 SHEET TITLE:

CIVIL DETAILS

SHEET:

C300

SCHMATIC DESIGN –  
 NOT FOR  
 CONSTRUCTION

**OCCUPANCY AND EGRESS:**  
 USE GROUP AREAS: VEHICLE AND EQUIPMENT STORAGE  
 USE GROUP DESIGNATION: S-2  
 SQUARE FOOTAGE: 2100 sf  
 OCCUPANCY: 2100 / 300 GROSS = 7 OCC

**PROJECT DESCRIPTION:**  
 THE PROPOSED PROJECT IS A NEW DEPARTMENT OF PUBLIC WORKS VEHICLE STORAGE GARAGE.

**APPLICABLE BUILDING CODES:**  
 2009 MASSACHUSETTS STATE BUILDING CODE  
 2009 INTERNATIONAL BUILDING CODE (IBC)  
 780 CMR EIGHTH EDITION AMENDMENTS  
 2009 INTERNATIONAL MECHANICAL CODE (IMC)  
 248 CMR 10.00 UNIFORM STATE PLUMBING CODE (USPO)  
 2009 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)  
 2011 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA-70) WI 527 CMR BOARD OF FIRE PREVENTION REGULATIONS  
 521 CMR ARCHITECTURAL ACCESS BOARD

**USE AND OCCUPANCY CLASSIFICATION:**  
 SINGLE S-2 LOW-HAZARD STORAGE OCCUPANCY PER 780 CMR SECTION 508.3  
 S-2 STORAGE LOW-HAZARD STORAGE-ENCLOSED PARKING GARAGE AND EQUIPMENT STORAGE

**GENERAL BUILDING HEIGHTS AND AREAS:**  
 USE GROUP: S-2  
 CONSTRUCTION TYPE: II B  
 ALLOWABLE HEIGHT PER TABLE 503: 3 STORIES  
 ACTUAL HEIGHT: 1 STORY  
 ALLOWABLE AREA PER TABLE 503: 20,000  
 ACTUAL AREA: 2,100

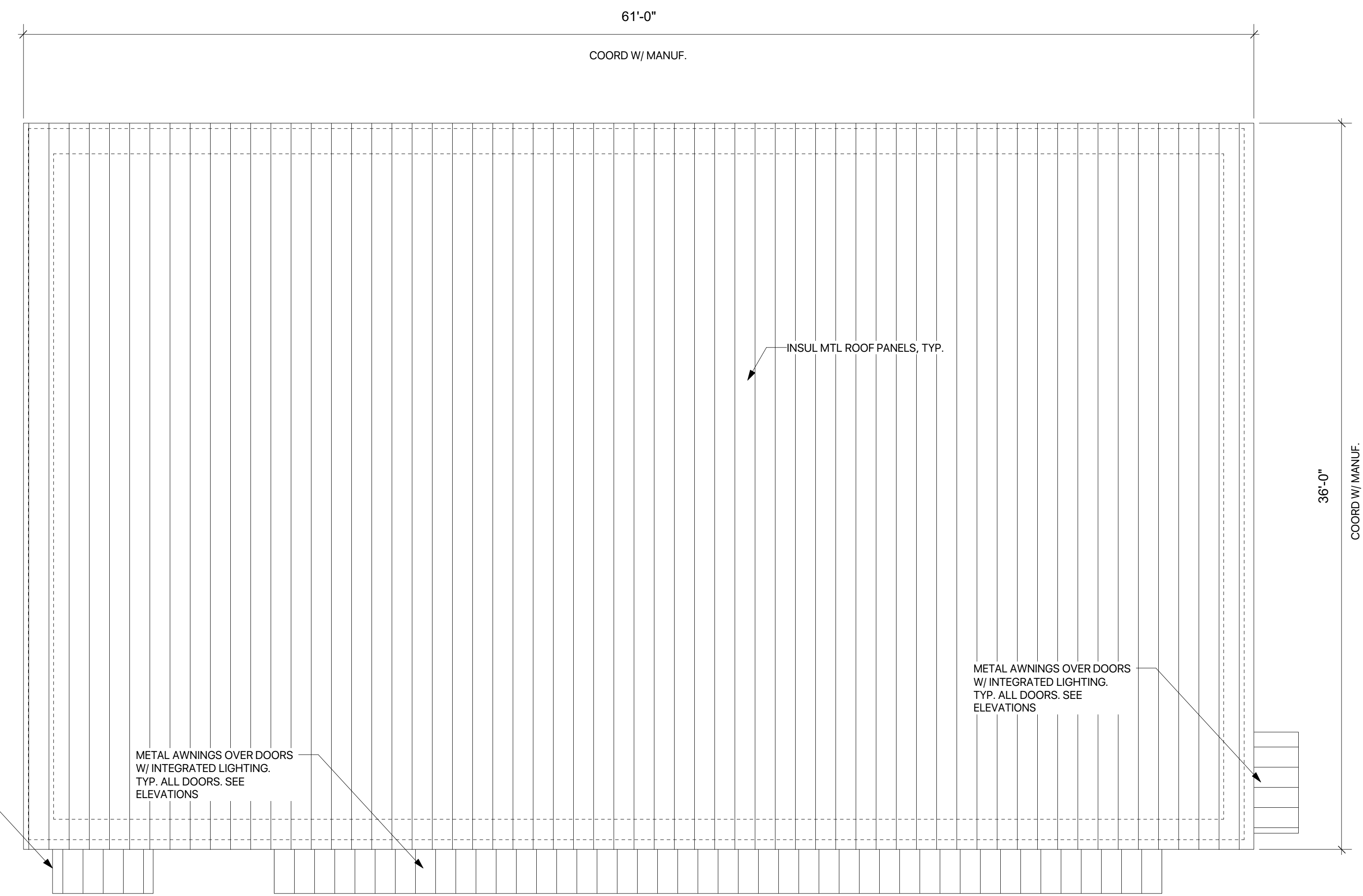
**FIRE RESISTANCE RATING REQUIREMENTS:**  
 TYPE II B CONSTRUCTION (TABLE 601AND602)  
 BUILDING ELEMENT: 0 HRS  
 STRUCTURAL FRAME: 0 HRS  
 BEARING WALLS: 0 HRS  
 EXTERIOR: 0 HRS  
 INTERIOR: 0 HRS  
 FLOOR CONSTRUCTION: 0 HRS  
 ROOF CONSTRUCTION: 0 HRS

NUMBER OF EXITS AND CONTINUITY (SECTION 1021)  
 NUMBER OF EXITS REQUIRED: 2  
 DISTANCE BETWEEN EXITS: 50'

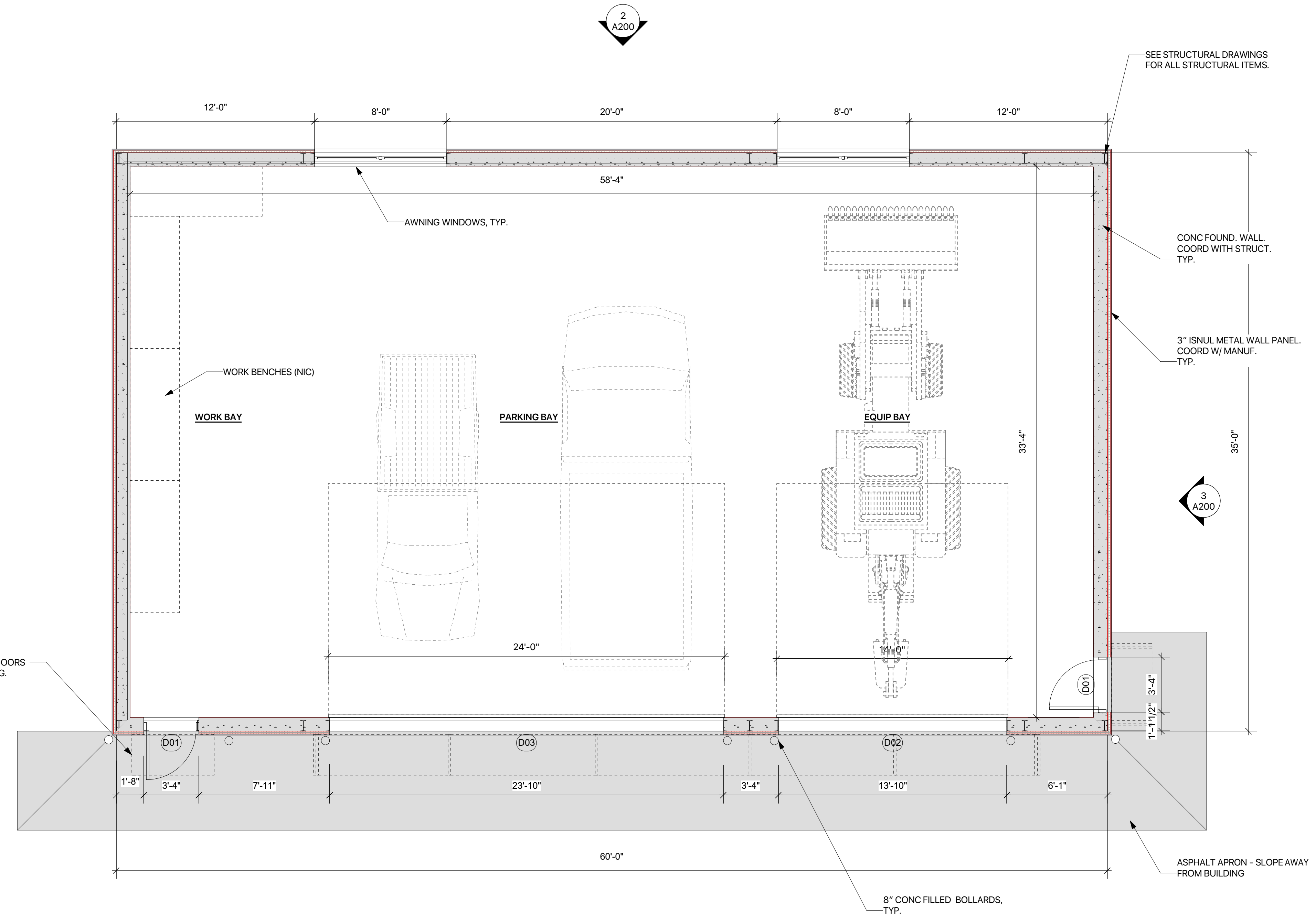
**MAXIMUM EXIT ACCESS TRAVEL DISTANCE - (TABLE 1016.1)**  
 WITHOUT SPRINKLER SYSTEM  
 USE GROUP: S-2 300FT

**DRAWING LIST - ARCHITECTURAL**

- A100 PLANS & CODE SUMMARY
- A200 ELEVATIONS AND SECTIONS
- A300 DOOR SCHEDULE AND DETAILS



1 ROOF PLAN  
 SCALE: 1/4" = 1'-0"



2 FLOOR PLAN  
 SCALE: 1/4" = 1'-0"

PROGRESS - NOT FOR CONSTRUCTION

PREPARED FOR:



Department of Public Works  
 25 Brook Street  
 Ayer, MA  
 (978) 772-8240

PROJECT TITLE

**Ayer DPW Garage**  
**Grove Pond WTP**  
**Barnum Road**

PROJECT ARCHITECT:

**WILLIAM SLOAN ASSOCIATES**  
 ARCHITECTS

551 MAIN STREET WINCHESTER, MA 01890 781-729-2910

STRUCTURAL ENGINEER:

MECHANICAL ENGINEER:

ELECTRICAL ENGINEER:

Issues / Revisions

No. Date Notes

Designed By CS

Project Manager

Drawn By JBW

Date 5/20/16

Drawing Title

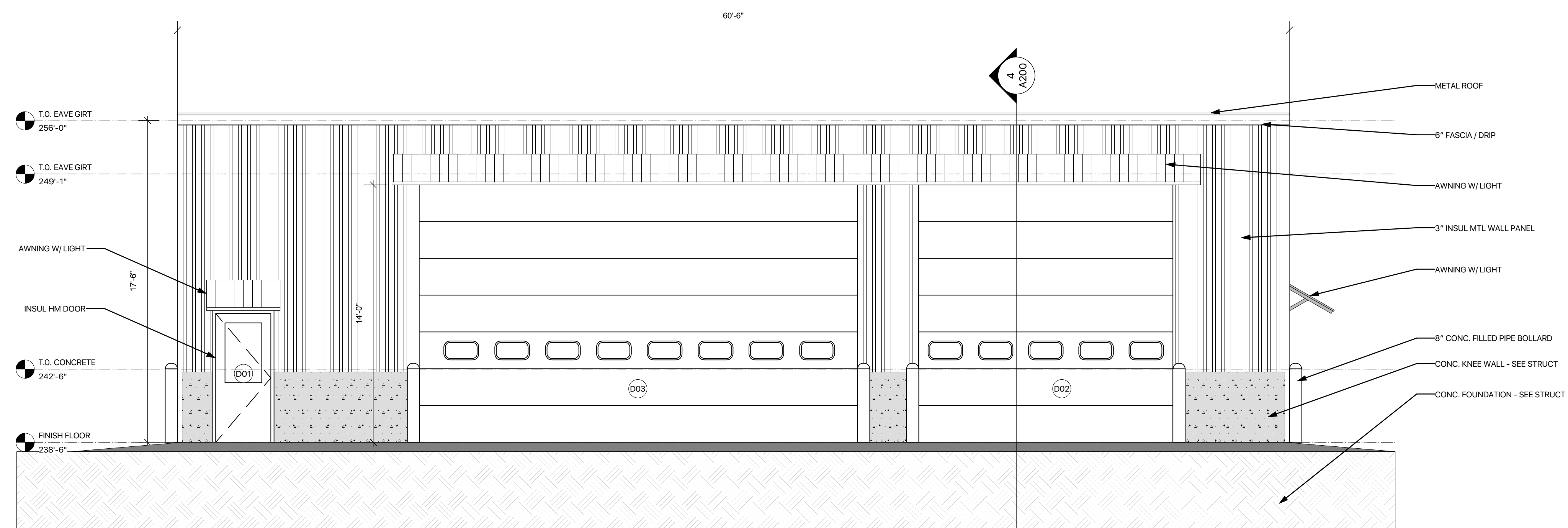
**PLANS & CODE SUMMARY**

Scale 1/4" = 1'-0"

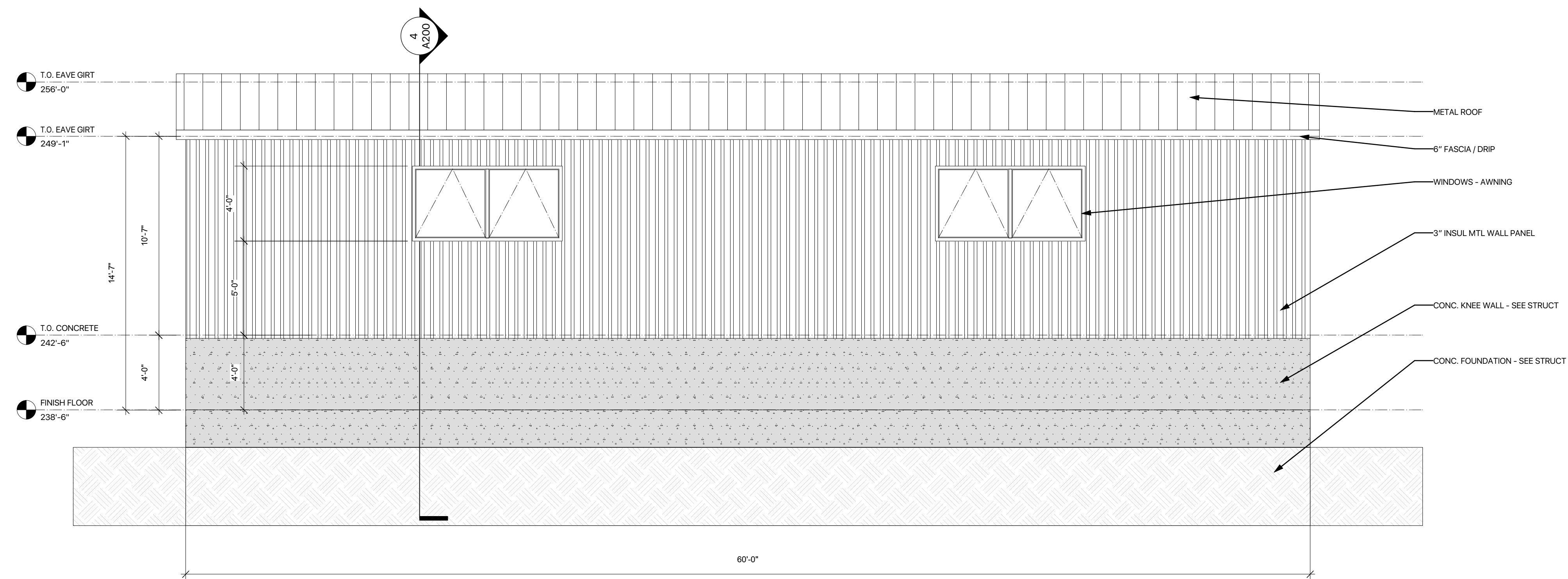
Drawing No.

**A100**

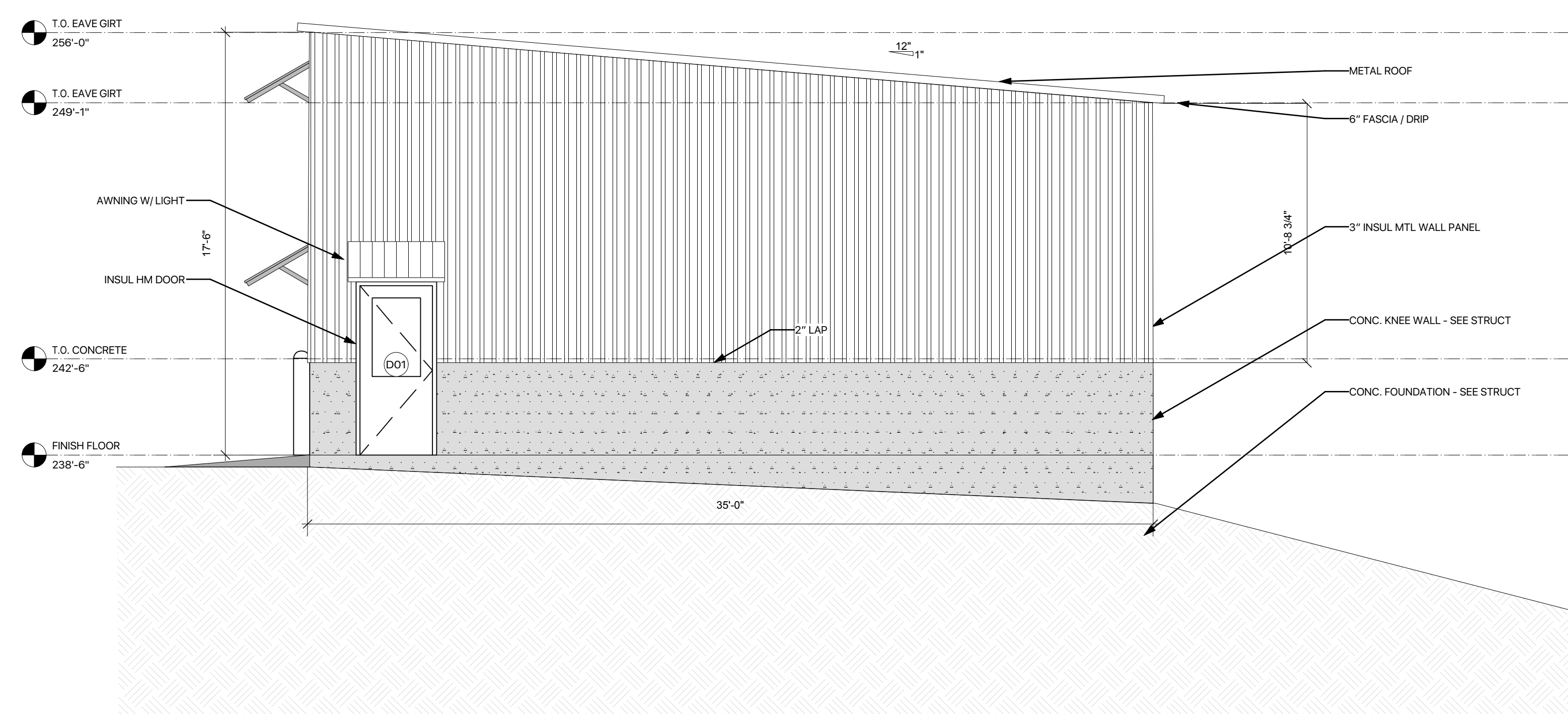
No.	Date	Notes



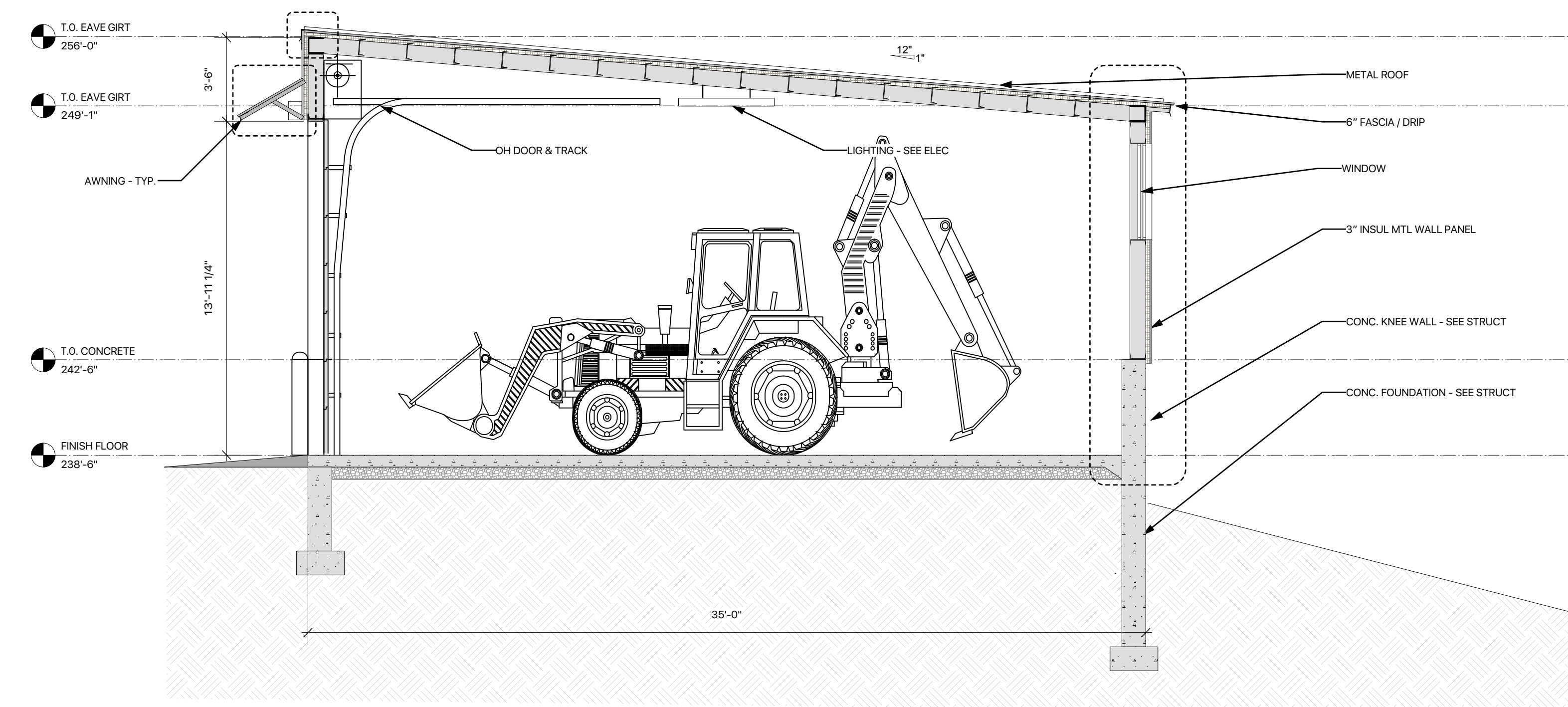
**1 SOUTH ELEVATION**  
Scale: 1/4" = 1'-0"



**2 NORTH ELEVATION**  
Scale: 1/4" = 1'-0"




**3 EAST ELEVATION**  
SCALE: 1/4" = 1'-0"



**4 SECTION**  
Scale: 1/4" = 1'-0"

**Door Schedule**

Mark	AMT	Nominal Size			Door Style					Door Frame				Door Data			Comments
		Width	Height	Thickness	Door Operation	Slab Style	Fire Rating	HW Set	Glaz. Style	Frame Type	Jamb Thick	Head Detail	Jamb Detail	Mfr	Accessories		
D 01	2	3'0"	6'8"	1 3/4"	Swing Simple	HM / Insul	-	-	-	HM	2"	5	3 & 4		VISION PANEL	COORD W/ METAL BUILDING MANUF.	
D 02	1	14'0"	14'0"	1 3/4"	Overhead	Insul	-	-	-	-	0"	6	1 & 2			COORD W/ METAL BUILDING MANUF.	
D 03	1	24'0"	14'0"	1 3/4"	Overhead	Insul	-	-	-	-	0"	6	1 & 2			COORD W/ METAL BUILDING MANUF.	

PREPARED FOR:  
  
 Department of Public Works  
 25 Brook Street  
 Ayer, MA  
 (978) 772-8240

PROJECT TITLE  
**Ayer DPW Garage**  
**Grove Pond WTP**  
**Barnum Road**

PROJECT ARCHITECT:  
**WILLIAM SLOAN ASSOCIATES**  
 ARCHITECTS  
 551 MAIN STREET WINCHESTER, MA 01890 781-729-2910

STRUCTURAL ENGINEER:  
 MECHANICAL ENGINEER:  
 ELECTRICAL ENGINEER:

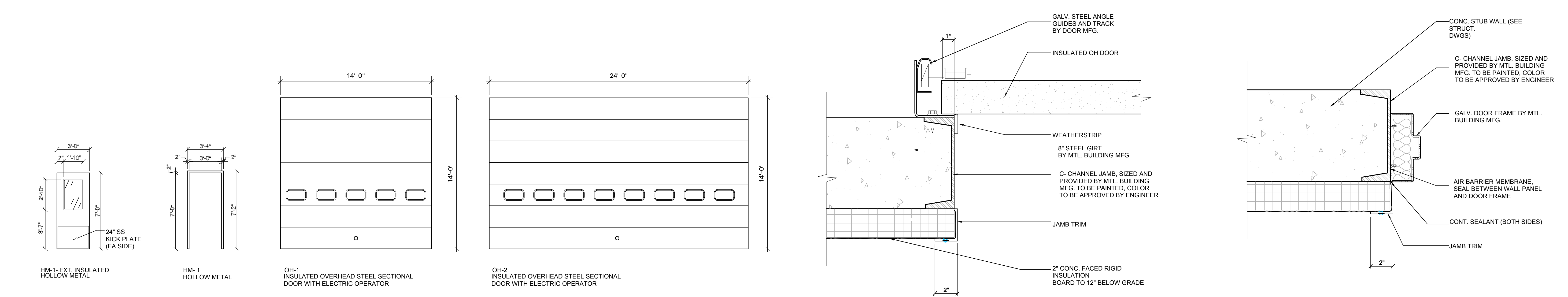
Issues / Revisions		
No.	Date	Notes

Designed By: CS  
 Project Manager:  
 Drawn By: Drawn By:  
 Date: 5/20/16  
 Drawing Title:

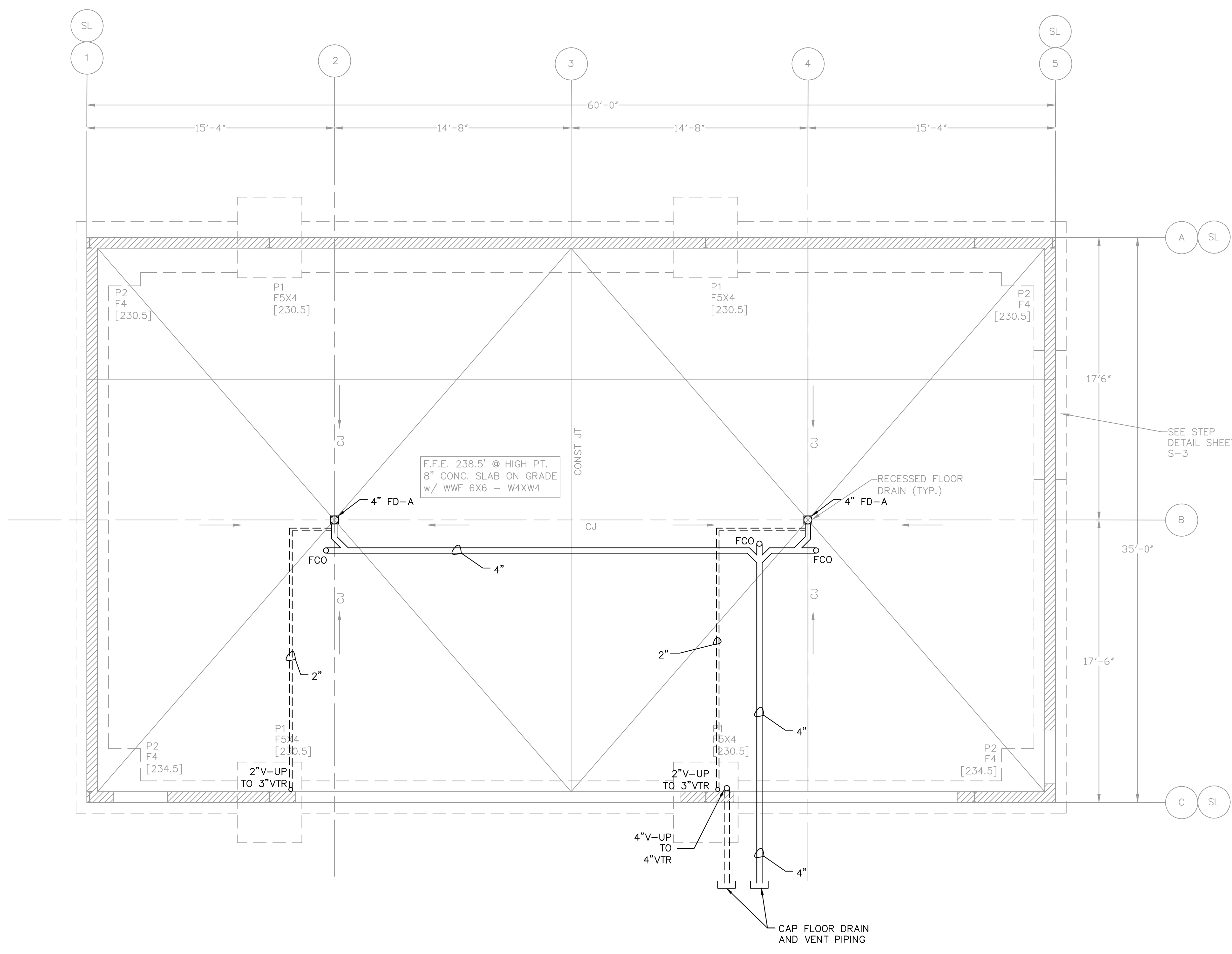
**DOOR SCHEDULE AND DETAILS**  
 Scale: Sheet Scale  
 Drawing No.:

**A300**

PROGRESS - NOT FOR CONSTRUCTION



Scale: Sheet Scale  
 Drawing No.:



**PLUMBING PLAN**  
1/4"=1'-0"

FLOOR DRAIN SCHEDULE		
TAG	LOCATION	REMARKS
FD-A	VEHICLE BAY	12-INCH HEAVY DUTY ROUND TOP FLOOR DRAIN WITH DEEP BODY AND CAULK OUTLET, CAST IRON STRAINER SEDIMENT BUCKET, INLINE TRAP SEALER, AND TRAP GUARD

**PLUMBING**

**PART 1 - GENERAL**

- GENERAL PROVISIONS: DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK IN CONTRACT.
- SCOPE: PERFORM WORK AND PROVIDE MATERIAL AND EQUIPMENT AS SHOWN ON DRAWINGS AND AS SPECIFIED IN THIS SECTION OF THE SPECIFICATIONS THAT ARE NECESSARY TO MAKE THE SYSTEMS COMPLETE AND FULLY OPERATIONAL AS INTENDED IN THE CONSTRUCTION DOCUMENTS. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
  - THE DESIGN INTENT AS ILLUSTRATED ON THESE DRAWINGS.
  - ALL TESTING AND CERTIFICATIONS NECESSARY FOR COMPLIANCE AND ANY REQUIRED REMEDIAL ACTIONS AND RETESTING DUE TO FAILURE.
- SITE VISIT: VISIT AND CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS THAT MAY AFFECT WORK OF THIS SECTION BEFORE SUBMITTING BID. NO EXTRA PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY DISCERNED BY AN EXPERIENCED OBSERVER.
- RELATED WORK: THE FOLLOWING WORK IS NOT INCLUDED IN THIS SECTION AND WILL BE PROVIDED UNDER OTHER SECTIONS:
  - TEMPORARY LIGHT, POWER, WATER, HEAT, GAS AND SANITARY FACILITIES FOR USE DURING CONSTRUCTION.
- CODES, STANDARDS, AUTHORITIES AND PERMITS: CODES, LAWS AND ORDINANCES PROVIDE A BASIS FOR THE MINIMUM INSTALLATION CRITERIA. THESE SCHEMATIC DRAWINGS AND SPECIFICATIONS ILLUSTRATE THE GENERAL SCOPE REQUIRED FOR THIS PROJECT. THE CONTRACTOR SHALL MEET ALL CODES, STANDARDS, AND PERMIT REQUIREMENTS WITH HIS FINAL DESIGN AND CONSTRUCTION. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND BACKCHARGES AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES HAVING JURISDICTION AS REQUIRED FOR THE EXECUTION OF ALL WORK ASSOCIATED WITH THIS PROJECT. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITIONS OF:
  - THE STATE BUILDING CODE
  - THE STATE PLUMBING AND FUEL GAS CODE
  - THE STATE ELECTRICAL CODE
  - NFPA
  - DEPARTMENT OF ENVIRONMENTAL PROTECTION
  - DEPARTMENT OF PUBLIC SAFETY CODES
  - ARCHITECTURAL ACCESS BOARD
  - ALL OTHER APPLICABLE CODES, REGULATIONS, STANDARDS AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENT AND OTHER AUTHORITIES HAVING JURISDICTION.
  - APPLICABLE BASE BUILDING STANDARDS AND SPECIFICATIONS.
- INTERPRETATIONS OF DOCUMENTS: WHERE DRAWINGS OR SPECIFICATIONS DO NOT COINCIDE WITH MANUFACTURER'S RECOMMENDATIONS, OR ARE UNCLEAR AS TO INTENT, OR REQUIRED MATERIAL QUALITY, ADVISE THE ENGINEER IN WRITING BEFORE PROCEEDING WITH THE WORK. ALL COST FOR REWORK NECESSARY TO RESOLVE DISCREPANCIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- REQUESTS FOR INFORMATION: ANY RFI FOR RESOLVING AN APPARENT CONFLICT OR UNCLEARITY, OR A REQUEST FOR AN ADDITIONAL DETAIL, SHALL INCLUDE A SKETCH OR EQUIVALENT DESCRIPTION OF CONTRACTOR'S PROPOSED SOLUTION.
- SUBMITTALS: PROVIDE SPECIFIED ITEMS AND EQUIPMENT UNLESS -EQUAL- OR -APPROVED EQUAL- IS EXPLICITLY INDICATED ON THE DRAWINGS. DEVIATIONS TO SPECIFIED ITEMS SHALL BE AT THE SOLE RISK OF THE CONTRACTOR, WHO SHALL BE RESPONSIBLE FOR ALL ASSOCIATED CHANGES TO THIS AND OTHER TRADES. REVIEW OF THE SHOP DRAWINGS BY THE ENGINEER SHALL NOT ABSOLVE THE CONTRACTOR FROM MEETING THE FULL DESIGN INTENT OF THE ASSOCIATED SYSTEM(S). SUBMITTALS SHALL INDICATE PRIOR REVIEW AND APPROVAL BY THE RESPONSIBLE CONTRACTOR. SUBMIT FOR REVIEW (6) SETS OF MANUFACTURER'S PRODUCT DATA FOR THE FOLLOWING ITEMS WHERE APPLICABLE:
  - PIPE MATERIALS
  - FITTINGS
  - VALVES
  - DRAINS
  - INSULATION
  - HANGERS
  - TEST REPORTS
  - ALL CERTIFICATES ALLOW ENGINEER A MINIMUM OF 10 WORKING DAYS FOR PROCESSING AND REVIEW OF EACH SUBMISSION.
- OPERATION AND MAINTENANCE DATA: SUBMIT (3) SETS OF OPERATING AND MAINTENANCE MANUALS PRIOR TO THE COMPLETION OF THE PROJECT. O&M MANUALS SHALL INCLUDE SYSTEM DESCRIPTIONS, WIRING DIAGRAMS, WRITTEN WARRANTIES, RECOMMENDED SPARE PARTS AND ROUTINE MAINTENANCE REQUIREMENTS WITH RECOMMENDED INTERVALS.
- RECORD DRAWINGS: CAD RECORD DRAWING FILES SHALL BE SUBMITTED AT THE COMPLETION OF THE PROJECT SHOWING THE "AS-BUILT" CONDITION INCLUDING WORK INSTALLED AND ALL MODIFICATIONS OR ADDITIONS TO ORIGINAL DESIGN. OBTAIN THE AUTOCAD FILES FOR PREPARATION OF AS-BUILT DRAWINGS FROM THE ARCHITECT/ENGINEER. THE ARCHITECT AND ENGINEER ARE NOT GRANTING ANY OWNERSHIP OR PROPERTY INTEREST IN THE CAD DRAWINGS BY THE DELIVERY OF THE CAD FILES. THE USE OF THE CAD FILES AND DRAWINGS ARE LIMITED FOR THE SOLE PURPOSE OF ASSISTING IN THE CONTRACTOR'S PERFORMANCE IN ITS CONTRACTUAL OBLIGATIONS WITH RESPECT TO THIS PROJECT. ANY REUSE AND/OR OTHER USE BY THE CONTRACTOR WILL BE AT THE CONTRACTOR'S SOLE RISK AND WITHOUT LIABILITY TO THE ARCHITECT AND ENGINEER.

- WARRANTIES: WARRANTY INSTALLATION IN WRITING FOR ONE YEAR FROM DATE OF OWNER'S ACCEPTANCE OF CERTIFICATE OF SUBSTANTIAL COMPLETION. WHERE INDIVIDUAL EQUIPMENT SECTIONS SPECIFY LONGER WARRANTIES, PROVIDE THE LONGER WARRANTY. REPAIR, REPLACE OR PROVIDE TEMPORARY ACCOMMODATIONS FOR DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN 24 HOURS OF NOTIFICATION. WARRANTY SHALL INCLUDE A CONTACT PERSON (NAME AND 24 HOUR TELEPHONE NUMBER) FOR SERVICE REQUESTS. CORRECT DAMAGE CAUSED WHILE MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER WARRANTY PERIOD AT NO ADDITIONAL COST.
- COORDINATION: CONFER WITH ALL OTHER TRADES RELATIVE TO LOCATION OF ALL APPARATUS AND EQUIPMENT TO BE INSTALLED AND SELECT LOCATIONS SO AS NOT TO CONFLICT WITH OR HINDER THE PROGRESS OF THE WORK OF OTHER SECTIONS. WORK INSTALLED THAT CREATES INTERFERENCE OR RESTRICTS ACCESS REQUIRED BY CODE OR MAINTENANCE AND/OR ADJUSTMENTS SHALL BE MODIFIED AT NO ADDITIONAL COST TO THE OWNER.
- SUPPORTS: INCLUDE ALL STRUCTURAL STEEL SUPPORTS, HANGER BRACKETS, ETC., REQUIRED FOR THE EXECUTION OF THE WORK OF THIS SECTION. THE WELDS AND EDGES OF ALL BRACKETS SHALL BE FILED OR GROUND SMOOTH FOR PAINTING.
- CUTTING AND PATCHING: INCLUDE ALL CORING, CUTTING, PATCHING AND FIREPROOFING NECESSARY FOR THE EXECUTION OF THE WORK OF THIS SECTION. STRUCTURAL ELEMENTS SHALL NOT BE CUT WITHOUT WRITTEN APPROVAL OF THE ARCHITECT. ANY FIRE STOPPING REQUIRED BY CODE SHALL BE INSTALLED IN ACCORDANCE WITH THE FIRE STOPPING MANUFACTURER'S LISTED INSTALLATION DETAILS AND BE LISTED BY UL OR FM.
- HOISTING, SCAFFOLDING AND PLANKING: INCLUDE THE FURNISHING, SET-UP AND MAINTENANCE OF ALL HOISTING MACHINERY, CRANES, SCAFFOLDS, STAGING AND PLANKING AS REQUIRED FOR THE EXECUTION OF WORK FOR THIS SECTION.
- SAFETY PRECAUTIONS: LIFE SAFETY AND ACCIDENT PREVENTION SHALL BE A PRIMARY CONSIDERATION. COMPLY WITH ALL OF THE SAFETY REQUIREMENTS OF THE OWNER AND OSHA THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD OF THE PROJECT. FURNISH, PLACE AND MAINTAIN PROPER GUARDS AND ANY OTHER NECESSARY CONSTRUCTION REQUIRED TO SECURE SAFETY OF LIFE AND PROPERTY.
- ACCESSIBILITY: ALL WORK PROVIDED UNDER THIS SECTION OF THE SPECIFICATION SHALL BE INSTALLED SO THAT PARTS REQUIRING PERIODIC INSPECTION, MAINTENANCE AND REPAIR ARE READILY ACCESSIBLE. WORK OF THIS TRADE SHALL NOT INFRINGE UPON CLEARANCES REQUIRED BY EQUIPMENT OF OTHER TRADES, ESPECIALLY CODE REQUIRED CLEARANCES TO ELECTRICAL EQUIPMENT.
- PROTECTION OF WORK AND PROPERTY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CARE AND PROTECTION OF ALL WORK INCLUDED UNDER THIS SECTION UNTIL THE COMPLETION AND FINAL ACCEPTANCE OF THIS PROJECT. PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE FROM ALL CAUSES INCLUDING, BUT NOT LIMITED TO, FIRE, VANDALISM AND THEFT. ALL MATERIALS AND EQUIPMENT DAMAGED OR STOLEN SHALL BE REPAIRED OR REPLACED WITH EQUAL MATERIAL OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER. PROTECT ALL EQUIPMENT, OUTLETS AND OPENINGS, AND ROOF PENETRATIONS WITH TEMPORARY PLUGS, CAPS AND COVERS. PROTECT WORK AND MATERIALS OF OTHER TRADES FROM DAMAGE THAT MIGHT BE CAUSED BY WORK OR WORKMEN UNDER THIS SECTION AND MAKE GOOD DAMAGE THUS CAUSED. DAMAGED MATERIALS ARE TO BE REMOVED FROM THE SITE. NO SITE STORAGE OF DAMAGED MATERIALS WILL BE ALLOWED. ANY DAMAGE TO EXISTING SYSTEMS AND EQUIPMENT CAUSED BY THIS CONTRACTOR DURING INSTALLATION SHALL BE REPAIRED AND/OR REPLACED AT THE CONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF THE BUILDING OWNER.
- SEISMIC RESTRAINT REQUIREMENTS: PROVIDE SEISMIC RESTRAINTS AS REQUIRED IN ACCORDANCE WITH THE STATE BUILDING CODE. A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER, LICENSED IN THE APPLICABLE STATE FOR THE PROJECT LOCATION, SHALL PREPARE THE SEISMIC RESTRAINT DESIGN AND CERTIFY THAT THE DESIGN IS IN COMPLIANCE WITH THE STATE BUILDING CODE REQUIREMENTS.
- PROJECT CLOSEOUT: A CERTIFICATE OF COMPLETION SHALL BE ISSUED BY THE CONTRACTOR INDICATING THAT THE INSTALLATION IS IN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS AND ALL APPLICABLE LOCAL, STATE AND FEDERAL STATUTES AND CODES. ALL SUBMITTALS, AS-BUILTS, O&M MANUALS, AND TESTING AND BALANCING REPORTS ARE TO BE PROVIDED, FOR ENGINEER'S REVIEW, PRIOR TO REQUEST FOR COMPLETION CERTIFICATES. IN ADDITION, AND ALSO PRIOR TO REQUEST FOR COMPLETION CERTIFICATES, ALL PUNCH LIST ITEMS MUST BE COMPLETED TO THE SATISFACTION OF THE ENGINEER. THE CONTRACTOR MUST VERIFY THAT ALL SEQUENCES OF OPERATIONS AND CONTROLS HAVE BEEN INCORPORATED AND ALL SYSTEMS AND EQUIPMENT ARE WORKING PER THE SPECIFIED SEQUENCES OF OPERATIONS. A BLANK CONTRACTOR'S CERTIFICATE FORM CAN BE FURNISHED BY THE ENGINEER UPON REQUEST. FINAL INSPECTION BY THE ENGINEER SHALL BE CONDUCTED AFTER RECEIPT OF THE CERTIFICATE OF COMPLETION. PREMATURE REQUESTS FOR FINAL INSPECTIONS THAT REQUIRE REINSPECTION OF DEFICIENT ITEMS WILL RESULT IN BACK CHARGES OF THE COSTS ASSOCIATED WITH THE REINSPECTION.
- ELECTRICAL WORK: ALL ELECTRICAL APPARATUS AND CONTROLS FURNISHED AND THE INSTALLATION THERE OF, AS A PART OF PLUMBING WORK, SHALL CONFORM TO APPLICABLE REQUIREMENTS UNDER THE ELECTRICAL DRAWINGS AND SPECIFICATION.

CERTIFICATION:

STATUS:

ENGINEER:

Ayer DPW  
25 Brook Street  
Ayer, Massachusetts

REVISIONS:

MARK	DATE	DESCRIPTION

PROJECT:

PRE-ENGINEERED GARAGE AT GROVE POND WATER TREATMENT PLANT

FILE NAME:  
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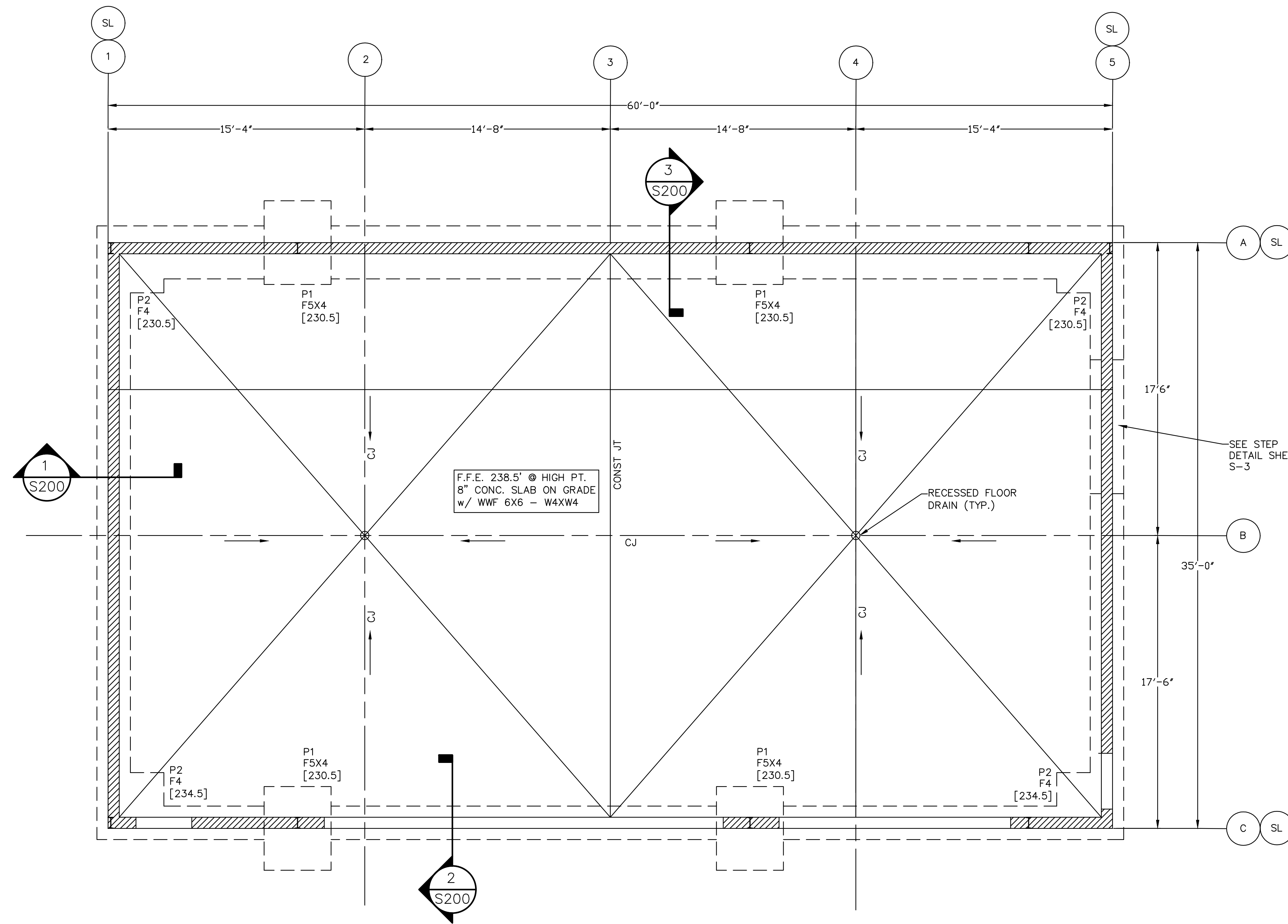
AUTHOR: DAN VAN SCHALKWYK, P.E.  
DRAFTER: DAN VAN SCHALKWYK, P.E.  
CHECKED BY: MARK WETZEL, P.E.  
DATE: JUNE 2016  
SHEET TITLE:

PLUMBING PLAN & NOTES

SHEET:

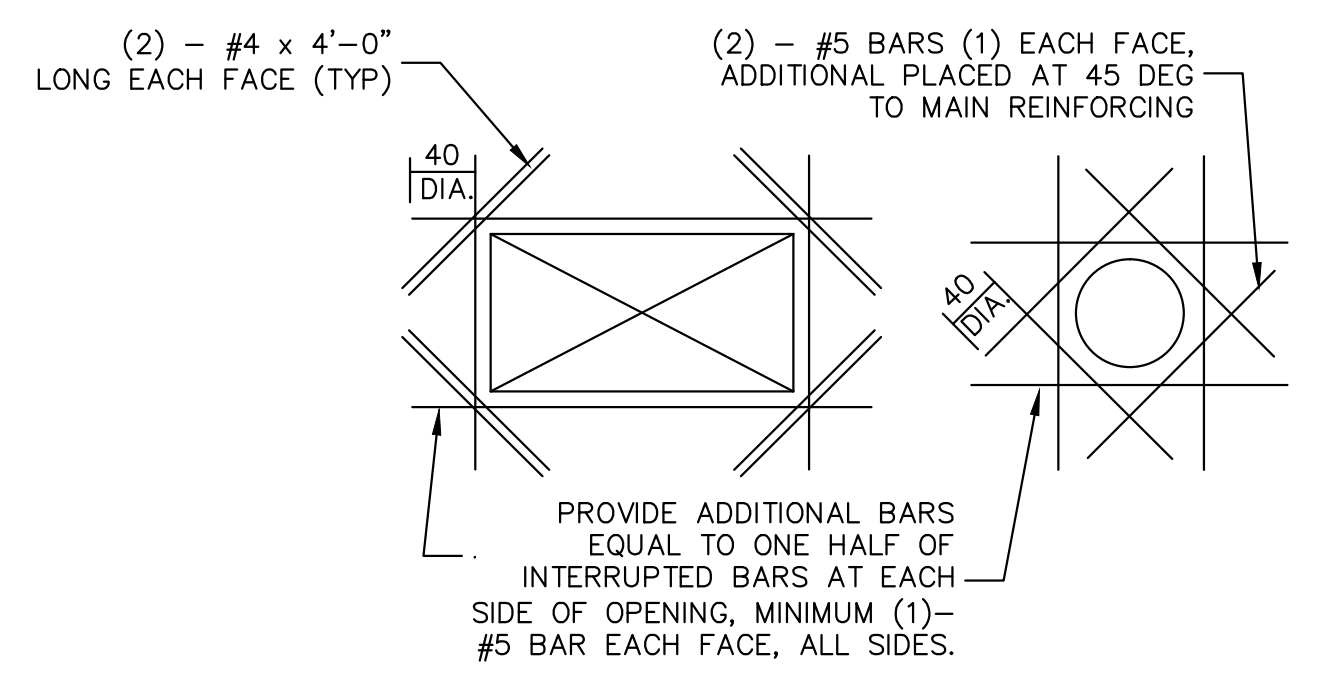
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SCHEMATIC DESIGN - NOT FOR CONSTRUCTION

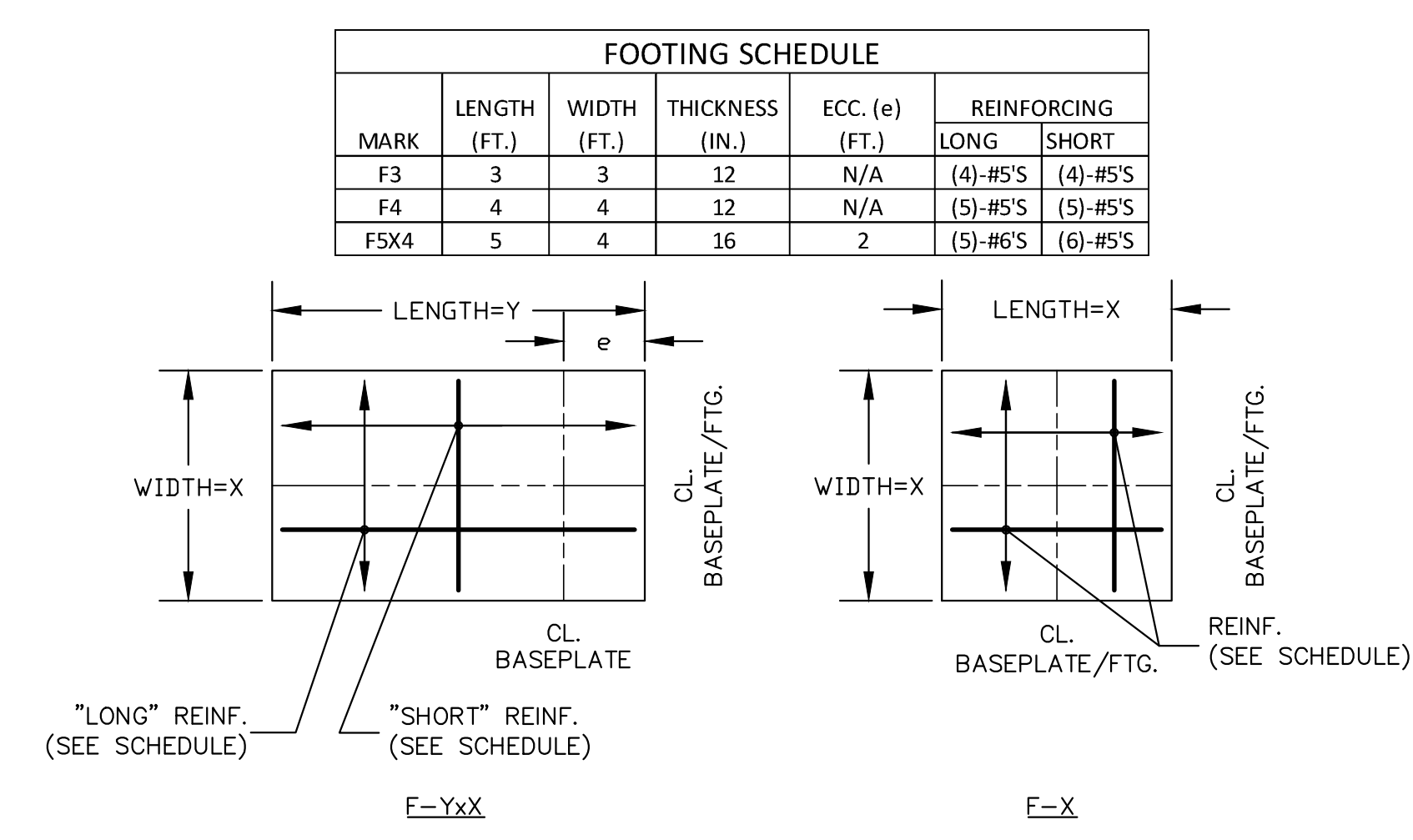


**FOUNDATION PLAN**  
1/4"=1'-0"

- FOUNDATION NOTES:**
1. ALL STRUCTURAL ELEMENTS ARE FOR SCHEMATIC DESIGN PURPOSES. FINAL STRUCTURAL DESIGN SHALL BE COMPLETED BY SELECTED PROPOSER.
  2. [230.5] CORRESPONDS TO BOTTOM OF FOOTING ELEVATION.
  3. BOX OUT SLAB AT COLUMNS AS REQUIRED FOR SETTING COLUMNS.
  4. SLAB PERIMETER SHALL BE A HIGH POINT UNLESS OTHERWISE NOTED.
  5. PX - INDICATES PIER TYPE. SEE PIER DETAILS ON SHEET S300.
  6. FX - INDICATES FOOTING TYPE. SEE FOOTING SCHEDULE.
  7. CJ INDICATES CONTROL JOINT LOCATION.
  8. SL INDICATES SPLICE LENGTH.

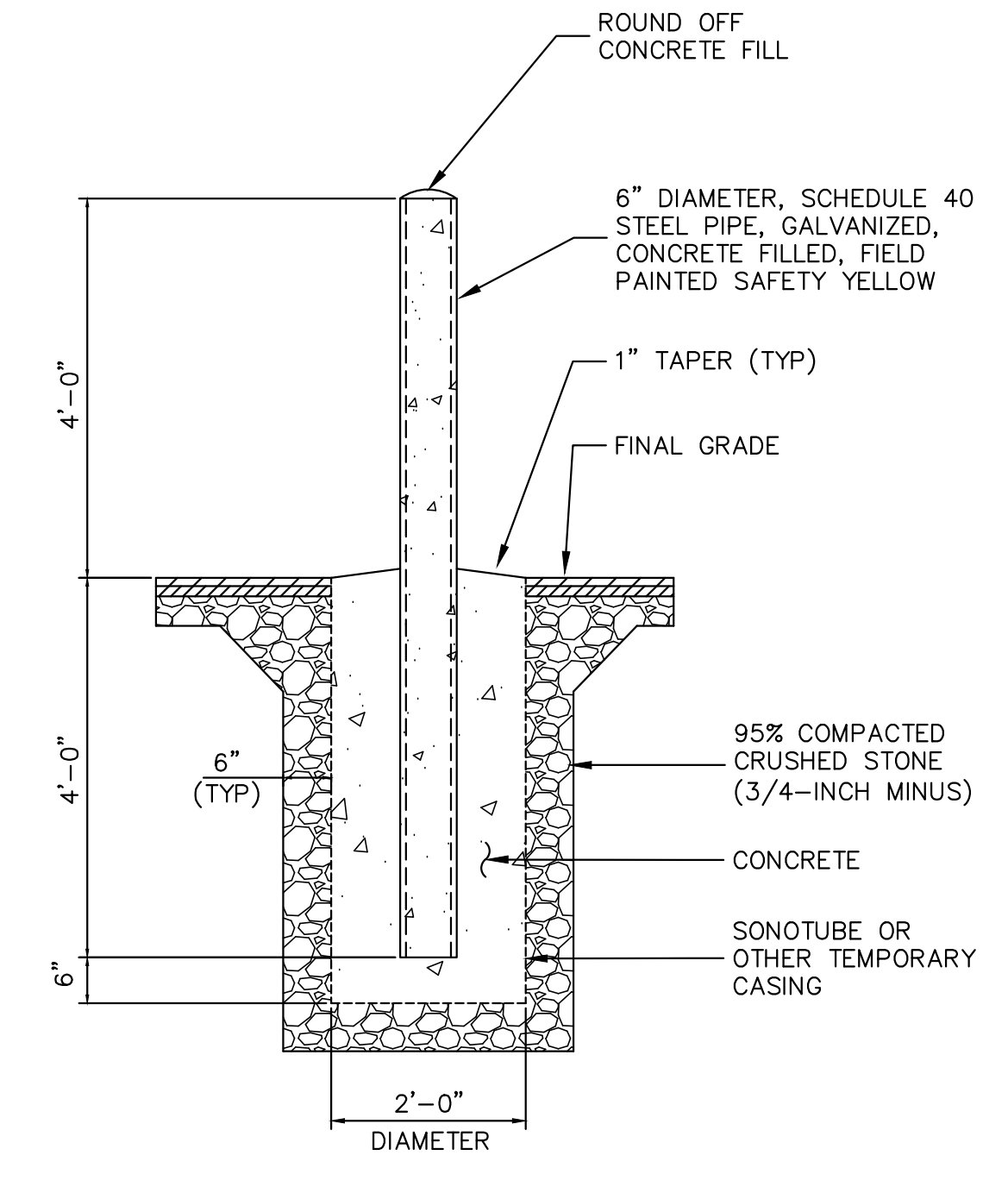


**TYPICAL REINFORCING AT SLAB AND WALL OPENINGS**  
NTS



- FOOTING NOTES:**
1. SQUARE FOOTINGS SHALL BE CENTERED BELOW COLUMNS UNLESS NOTED OTHERWISE.
  2. RECTANGULAR FOOTINGS SHALL BE ORIENTED AS SHOWN IN PLAN UNLESS NOTED OTHERWISE.
- 

**FOOTING SCHEDULE AND DETAILS**



**POST/BOLLARD DETAIL**  
NTS

CERTIFICATION:

STATUS:

ENGINEER:

Ayer DPW  
25 Brook Street  
Ayer, Massachusetts

REVISIONS:

MARK	DATE	DESCRIPTION

PROJECT:

PRE-ENGINEERED GARAGE AT GROVE POND WATER TREATMENT PLANT

FILE NAME:  
S:\1-PROJECTS\Garages - Parks and Water Depts\Water\Figures\S-1.DWG

AUTHOR: DAN VAN SCHALKWYK, P.E.  
DRAFTER: DAN VAN SCHALKWYK, P.E.  
CHECKED BY: MARK WETZEL, P.E.  
DATE: JUNE 2016

SHEET TITLE:  
**FOUNDATION PLAN & TYPICAL DETAILS**

SHEET:

S100

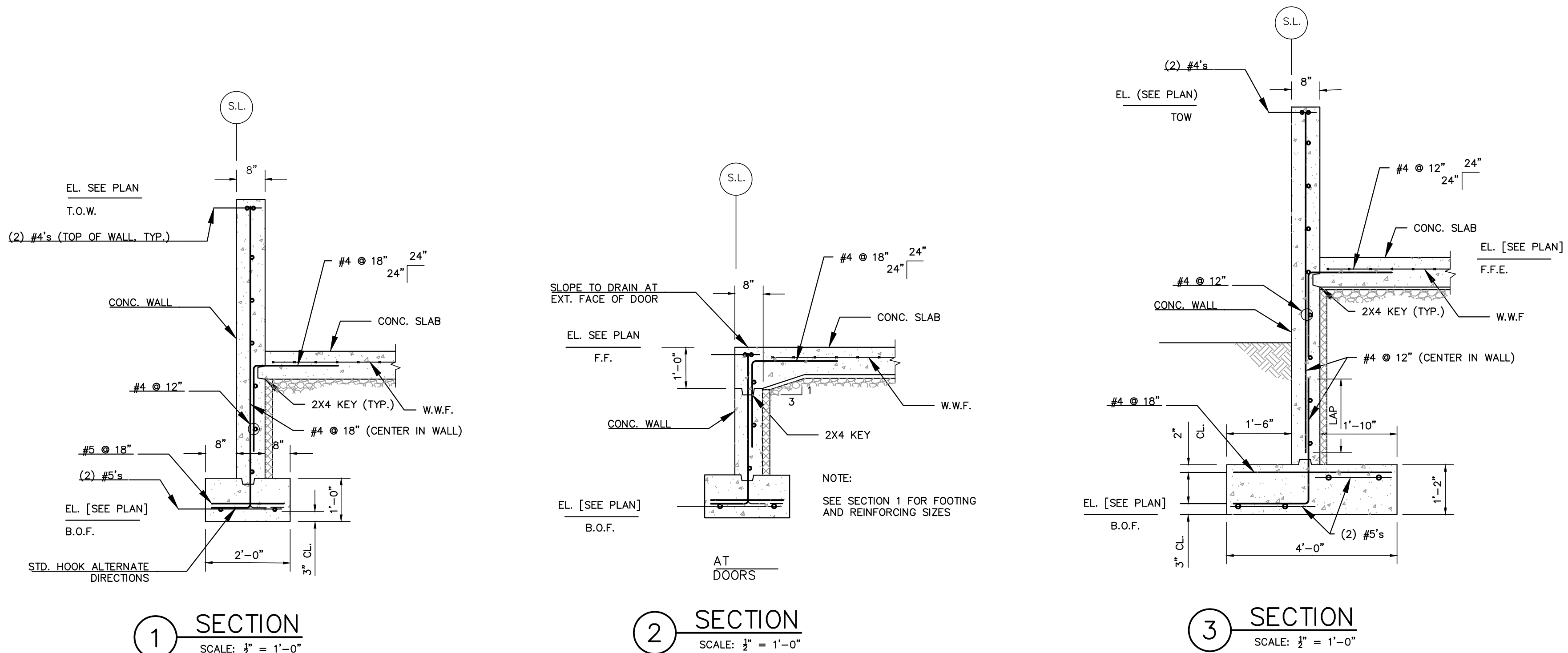
SCHEMATIC DESIGN –  
NOT FOR  
CONSTRUCTION

**GENERAL**

- STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND CIVIL DRAWINGS AND SPECIFICATIONS.
  - CODES AND STANDARDS:
    - MASSACHUSETTS STATE BUILDING CODE, LATEST EDITION.
    - ACI 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE.
    - AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, LATEST EDITION.
    - ASCE 7-05 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.
  - ALL SAFETY REGULATIONS SHALL BE FOLLOWED STRICTLY. METHODS OF CONSTRUCTION AND ERECTION OF STRUCTURAL MATERIALS IS CONTRACTOR'S RESPONSIBILITY.
  - UNLESS OTHERWISE NOTED, DETAILS SHOWN ON ANY DRAWING ARE TO BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS.
  - EXISTING DIMENSIONS AND CONDITIONS MUST BE VERIFIED OR DETERMINED IN THE FIELD BY THE CONTRACTOR. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE AFFECTED PORTION OF THE WORK.
- FOUNDATIONS**
- ALLOWABLE BEARING CAPACITY, 2.0 KSF.
  - ALL EXTERIOR BUILDING FOUNDATION INVERTS SHALL BE A MINIMUM OF 4'-0" BELOW FINISHED GRADE FOR FROST PROTECTION.
  - REMOVE ALL UNSUITABLE AND UNSATISFACTORY MATERIALS FROM BENEATH SLABS-ON-GRADE, FOOTINGS, FOUNDATIONS AND UTILITIES COMPLETELY.
  - REFILL ALL EXCAVATIONS FOR SLABS-ON-GRADE, FOOTINGS AND FOUNDATIONS WITH ENGINEERED FILL OR SOIL MATERIAL FROM ON-SITE SOURCES MEETING THE REQUIREMENTS FOR ENGINEERED FILL.
  - ALL FILL MATERIALS WITHIN THE BUILDING AREA SHALL BE COMPACTED TO NOT LESS THAN 95-PERCENT OF THE ASTM 1557 MAXIMUM DRY DENSITY.
  - A MINIMUM OF 12-INCHES OF COMPACTED ENGINEERED FILL SHALL BE PLACED BENEATH ALL FOUNDATION WALLS, FOOTINGS AND SLAB-ON-GRADE ELEMENTS, UNLESS OTHERWISE SHOWN. THE 12-INCH ENGINEERED FILL LAYER DIRECTLY BENEATH NEW FOOTINGS AND SLABS SHALL BE PLACED AND COMPACTED IN TWO LIFTS OF EQUAL THICKNESS. THE EXPOSED FINAL SUBGRADE SURFACE SHALL BE PROOF COMPACTED BY AN OBSERVED 4 TO 6 PASSES WITH APPROVED VIBRATORY COMPACTION EQUIPMENT. ANY LOOSE OR UNSUITABLE SOILS SHALL BE REMOVED AND REPLACED WITH COMPACTED ENGINEERED FILL. SUBGRADE AND ENGINEERED FILL COMPACTION IN/AROUND FOOTING INVERT ELEVATION SHALL BE SUBJECT TO GOOD ENGINEERING JUDGEMENT RELATIVE TO EXISTING SOIL AND GROUNDWATER CONDITIONS.
  - IF GROUNDWATER IS PRESENT, GROUNDWATER LEVELS SHALL BE MAINTAINED A MINIMUM OF 2'-0" BELOW THE DEEPEST EXCAVATION ELEVATION.
  - ALL WALLS RETAINING EARTH SHALL BE SHORED AGAINST LATERAL EARTH PRESSURE UNTIL FLOOR SLABS AND WALLS ABOVE ARE IN PLACE AND CONCRETE HAS ATTAINED ITS 28-DAY COMPRESSIVE STRENGTH.
  - DO NOT PLACE CONCRETE ON FROZEN GROUND OR IN WATER. FOUNDATIONS SHALL NOT BE PARTLY SUPPORTED ON ROCK AND PARTLY ON SOIL. ALL NEW FOOTINGS SHALL BE SUPPORTED ON A MINIMUM 12-INCH LAYER OF COMPACTED ENGINEERED FILL.
  - DO NOT PLACE BACKFILL UNBALANCED BY MORE THAN 2'-0" ON EITHER SIDE OF FOUNDATION WALLS AND PIERS, OR BY THE AMOUNT OF FINISH GRADE DIFFERENTIAL.
  - PROVIDE TEMPORARY OR PERMANENT SUPPORTS TO PREVENT HORIZONTAL MOVEMENT OR VERTICAL SETTLEMENT OF EXISTING STRUCTURES, STREETS, SOIL OR UTILITIES ADJACENT TO OR ON THE PROJECT SITE.
  - PROVIDE CONTINUOUS CONTROL OF SURFACE AND SUBSURFACE WATER DURING CONSTRUCTION AS NECESSARY TO PERFORM FOUNDATION WORK IN THE DRY AND ON UNDISTURBED SUBGRADE MATERIAL.
  - PROTECT FOUNDATIONS AND SLABS FROM FROST FOR A MINIMUM OF 28-DAYS AFTER CONCRETE POUR.
  - FOUNDATION CONSTRUCTION SHALL COMPLY WITH ALL OSHA REGULATIONS.

**CONCRETE**

- ALL CONCRETE SHALL HAVE ULTIMATE COMPRESSIVE STRENGTH OF 4,000 PSI AT 28-DAYS, UNLESS OTHERWISE NOTED.
- ALL CONCRETE WORK SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318) AND TO SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301).
- ALL CONCRETE SUBJECT TO FREEZE-THAW SHALL BE AIR-ENTRAINED. VERIFY AIR CONTENT BEFORE PLACEMENT OF ALL CONCRETE.
- REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60 (UNLESS OTHERWISE NOTED), OR ASTM A706 WHERE DOWELS ARE INDICATED TO BE WELDED.
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
- CONCRETE COVER FROM FACE OF CONCRETE TO MAIN REINFORCING SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE:
  - SLABS AND WALLS
    - (NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND) - 1"
    - FACE OF WALLS AND TOP OF SLABS EXPOSED TO EARTH, WEATHER, OR IMMERSED - 2"
    - FOOTINGS, BOTTOM OF WALLS AND STRUCTURAL SLABS CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH - 3"
- BAR PLACING SHALL CONFORM TO CONCRETE REINFORCING STEEL INSTITUTE'S RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS.
- REINFORCING BARS SHALL BE DETAILED IN ACCORDANCE WITH LATEST ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315).
- UNLESS INDICATED OTHERWISE ON THE DRAWINGS, REBAR SPLICES SHALL BE STAGGERED WITH NOT MORE THAN 50 PERCENT OF THE REBARS SPICED WITHIN A REQUIRED LAP LENGTH. LOCATIONS OF ALL SPLICES SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
- REINFORCING BARS SHALL BE LAPPED 36 BAR DIAMETER.
- WELDED WIRE FABRIC SHALL BE LAPPED 2 MESHES AT SIDES AND ENDS.
- ALL EXPOSED CORNERS OF CONCRETE SHALL HAVE A 3/4" x 45 DEGREE CHAMFER.
- PROVIDE WELDED WIRE FABRIC IN ALL SLABS-ON-GRADE, CONCRETE SIDEWALKS AND RAMPS AS FOLLOWS UNLESS SHOWN OTHERWISE:
  - 4" SLABS-ON-GRADE 6x6-W1.4xW1.4
  - 5" SLABS-ON-GRADE 6x6-W2.9xW2.9
- SLABS-ON-GRADE SHALL BE PLACED IN ALTERNATE STRIPS BOUNDED BY CONSTRUCTION AND CONTRACTION JOINTS. ALLOW 72 HOURS TO ELAPSE BETWEEN ADJACENT CONCRETE PLACEMENTS.
- MAXIMUM LENGTH OF CONCRETE WALL POUR SHALL BE 40 FEET. CONSTRUCTION JOINTS SHALL NOT BE LOCATED AT ANY CORNER OF WALLS. CONCRETE SHALL BE POURED IN LEVEL COURSES FULL HEIGHT. CONCRETE WALLS SHALL BE PLACED IN ALTERNATE SECTIONS BETWEEN VERTICAL CONSTRUCTION JOINTS.
- CONCRETE SLABS, INCLUDING CONCRETE PLACED ON STEEL DECK, SHALL BE PLACED SO THAT THE SLAB THICKNESS IS AT NO POINT LESS THAN THAT INDICATED ON THE DRAWINGS. THIS WILL REQUIRE THAT THE SLAB NOT BE CAST DEAD LEVEL WHERE SUPPORTING BEAMS, GIRDERS, OR TRUSSES HAVE AN UPWARD CAMBER. PROVIDE ADDITIONAL CONCRETE AS REQUIRED TO COMPENSATE FOR DEFLECTIONS OF STEEL BEAMS AND DECK.
- PROVIDE THE NECESSARY ACCESSORIES TO HOLD REINFORCEMENT SECURELY IN POSITION. MINIMUM REQUIREMENTS SHALL BE: HIGH CHAIRS, 4'-0" O.C. WITH CONTINUOUS #5 SUPPORT BAR; SLAB BOLSTERS, CONTINUOUS AND 3'-6" O.C.; BEAM BOLSTERS, 5'-0" O.C.
- DOWELS SHALL MATCH SIZE AND NUMBER OF MAIN BARS, UNLESS OTHERWISE NOTED.
- NO PIPES, CONDUITS AND SIMILAR NON-STRUCTURAL ELEMENTS SHALL BE EMBEDDED IN THE SLAB WITHOUT PERMISSION OF THE ENGINEER.



**TYPICAL ABBREVIATIONS**

d	= NOMINAL BAR DIAMETER
>	= GREATER THAN
≥	= EQUAL TO OR GREATER THAN
<	= LESS THAN
≤	= EQUAL TO OR LESS THAN

**CATEGORY**

STRUCTURAL ELEMENT	CONCRETE COVER	CATEGORY ACCORDING TO CENTER-TO-CENTER BAR SPACING			
		≤ 3d	> 3d < 4d	≥ 4d < 6d	≥ 6d
BEAMS, COLUMNS, AND INNER LAYERS OF WALLS OR SLABS	≤ d	1	1	1	2
	≥ d	1	3	5	6
ALL OTHERS	≤ d	1	1	1	2
	> d < 2d	1	3	3	4
	≥ d	1	3	5	6

**MINIMUM SPLICE AND EMBEDMENT LENGTH SCHEDULE**  
(UNLESS OTHERWISE SHOWN ON DRAWINGS)

CLASS B TENSION SPLICE       $F_y = 60,000 \text{ PSI}$

$F_c = 4000 \text{ PSI}$  NORMAL WEIGHT

BAR SIZE	TOP BARS				OTHER BARS				
	1	2	3	4	1	2	3	4	
#3	18"	18"	18"	18"	18"	18"	16"	16"	16"
#4	24"	24"	24"	24"	24"	20"	19"	19"	19"
#5	40"	32"	30"	30"	30"	31"	25"	23"	23"
#6	57"	45"	40"	36"	36"	44"	35"	31"	28"
#7	77"	62"	54"	43"	42"	59"	48"	42"	33"
#8	102"	81"	71"	57"	51"	78"	63"	55"	44"
#9	129"	103"	90"	72"	64"	99"	79"	69"	56"
#10	163"	131"	114"	92"	82"	126"	101"	88"	70"
#11	200"	160"	140"	112"	100"	154"	123"	108"	86"

**4 SECTION**  
SCALE: NTS

CERTIFICATION:

STATUS:

ENGINEER:

Ayer DPW  
25 Brook Street  
Ayer, Massachusetts

REVISIONS:

MARK	DATE	DESCRIPTION

PROJECT:

PRE-ENGINEERED GARAGE AT GROVE POND WATER TREATMENT PLANT

FILE NAME:  
S:\1-PROJECTS\Garages - Parks and Water Depts\Water\Figures\S-1.DWG

AUTHOR: DAN VAN SCHALKWYK, P.E.  
DRAFTER: DAN VAN SCHALKWYK, P.E.  
CHECKED BY: MARK WETZEL, P.E.

DATE: JUNE 2016

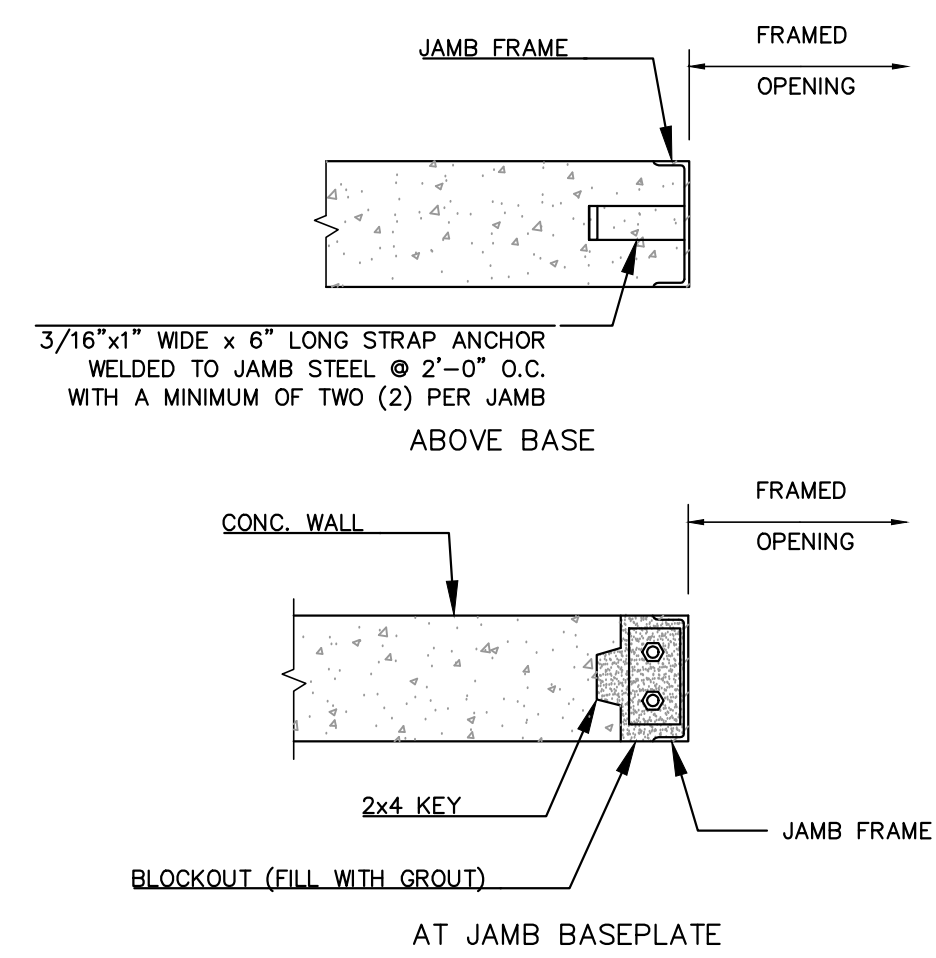
SHEET TITLE:  
GENERAL NOTES AND TYPICAL DETAILS

SHEET:

SCHEMATIC DESIGN – NOT FOR CONSTRUCTION

S200

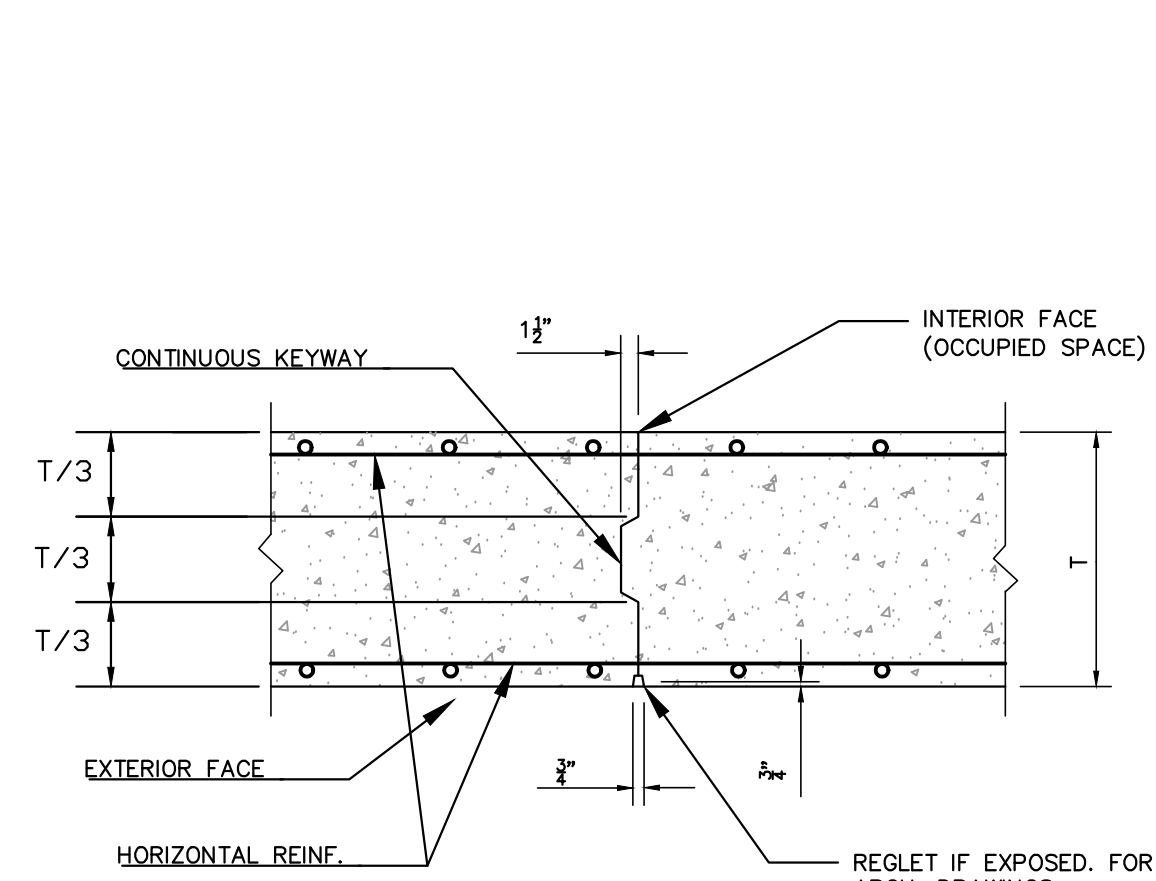




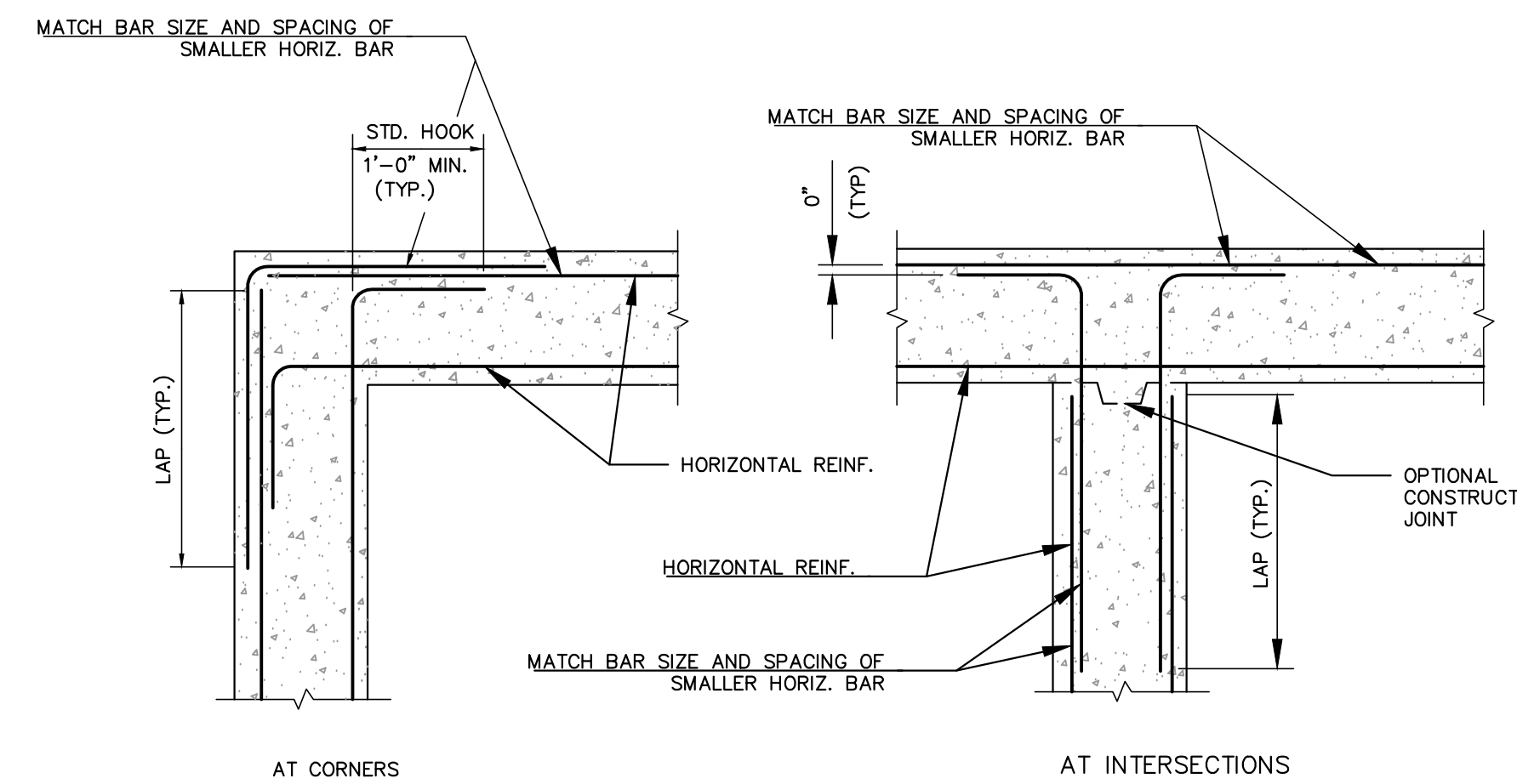
4 TYPICAL DOOR JAMB DETAILS  
SCALE: N.T.S.

TYPICAL DOOR JAMB NOTES:

- JAMB FRAMING AND BASE CONNECTION DESIGNED BY METAL BUILDING MANUFACTURER.
- COORDINATE INSTALLATION OF DOOR JAMB WITH PLACEMENT OF CONCRETE WALLS
- WALL REINF. NOT SHOWN FOR CLARITY.
- ALL STEEL SHOWN IS GALVANIZED.



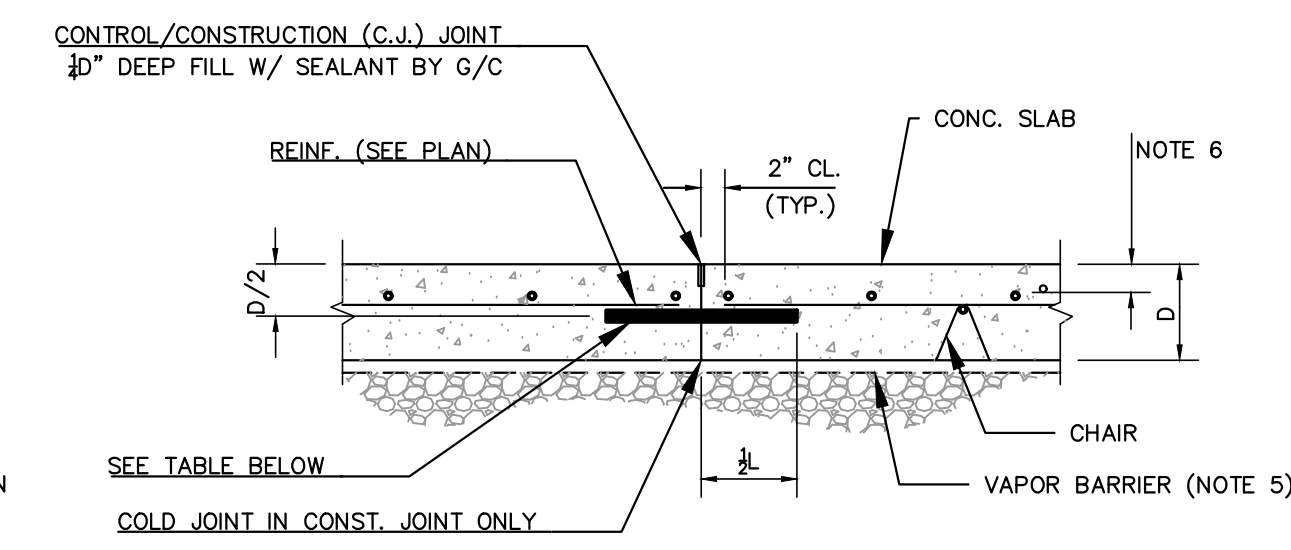
3 WALL CONSTRUCTION JOINTS  
SCALE: N.T.S.



2 HORIZONTAL WALL REINFORCING DETAILS  
SCALE: N.T.S.

REINFORCING NOTE(S):

- VERTICAL REINFORCING NOT SHOWN FOR CLARITY
- REINFORCING APPLIES TO ALL CONCRETE AND MASONRY CORNERS/INTERSECTIONS.
- REFER TO LAP SPLICE TABLE FOR REQUIRED LENGTH
- WHERE BARS OF DIFFERENT SIZE SPICE, LAP LENGTH SHALL BE AS REQUIRED FOR THE SMALLER BAR

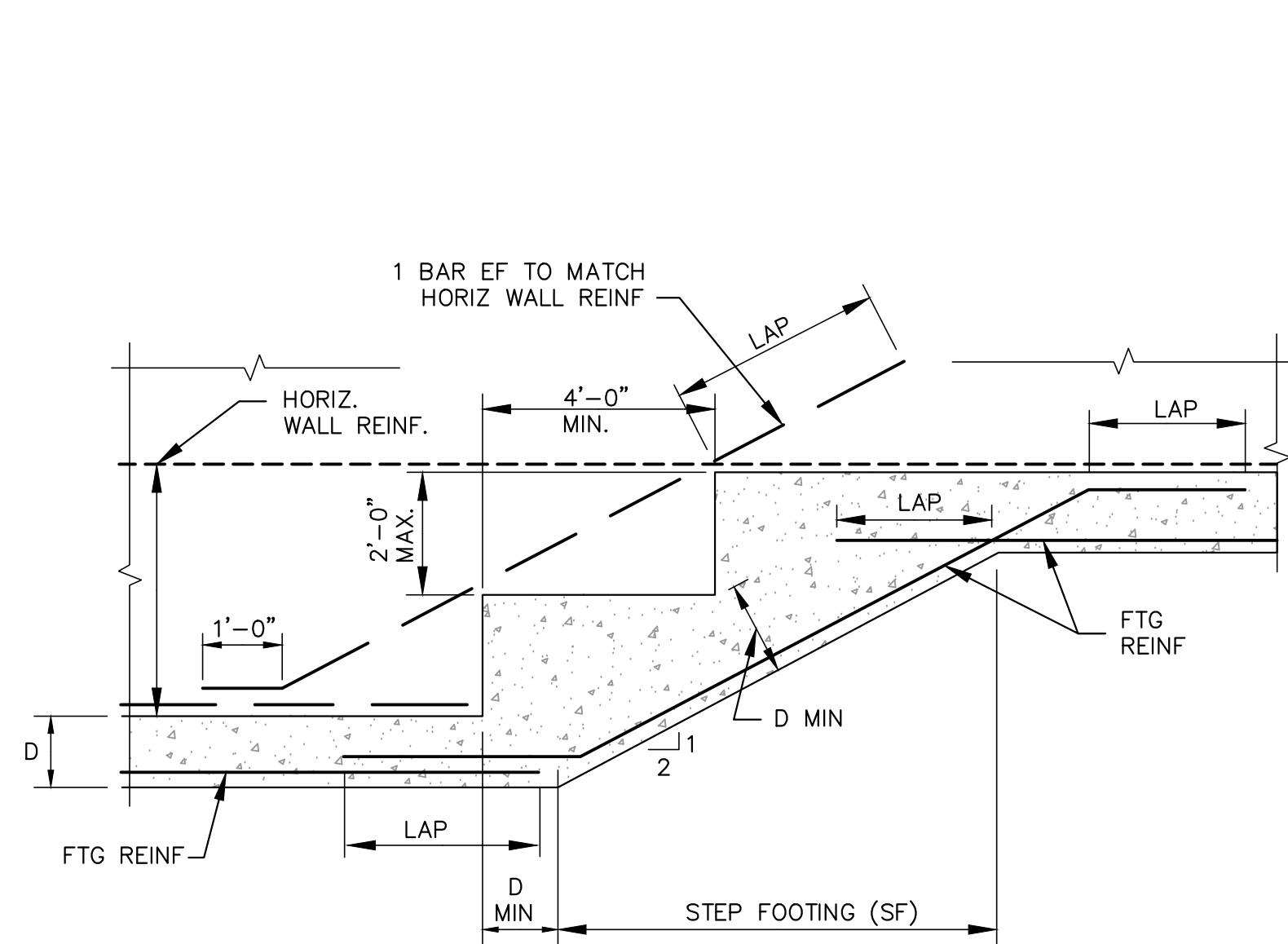


DOWEL SIZE AND SPACING			
SLAB THICKNESS, IN.	MIN. DOWEL LENGTH (L), IN.	MAXIMUM DOWEL SPACING, IN.	DOWEL DIAMETER AND TYPE
LESS THAN 8	N/A	N/A	N/A
8 TO AND INCLUDING 11.5	16	12	1" BAR

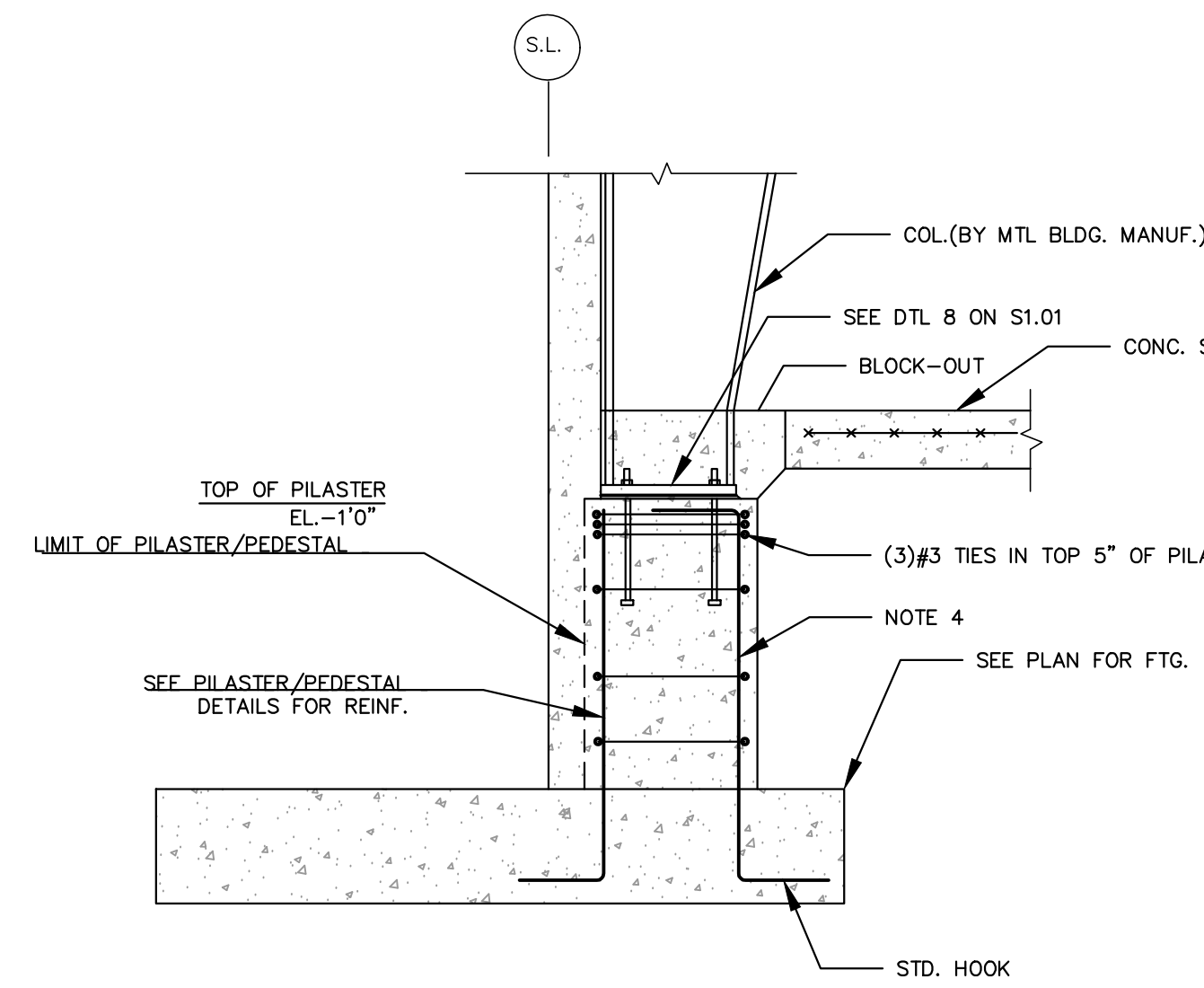
1 SLAB ON GRADE

SLAB NOTE(S):

- ALL DOWELS SHALL BE STRAIGHT, SMOOTH AND FREE FROM BURRS AT THE END
- ONE-HALF OF EACH DOWEL SHALL BE OILED OR OTHERWISE TREATED TO PREVENT BONDING WITH THE CONCRETE.
- CONTRACTOR SHALL SECURELY SUPPORT DOWELS BY MEANS OF DOWEL BASKETS TO PREVENT ANY DISPLACEMENT OF THE DOWELS DURING CONCRETE PLACEMENT
- STOP REINFORCING 2" FROM EACH SIDE OF CONTROL/CONSTRUCTION JOINTS.
- PUNCTURES IN THE VAPOR BARRIER MUST BE SEALED. ENGINEER SHALL INSPECT THE CONDITION OF THE VAPOR BARRIER BEFORE PLACING CONCRETE.
- REINFORCING SHALL BE PLACED 2" OR D/3 FROM FINISH FLOOR



STEP FOOTING DETAIL  
NTS

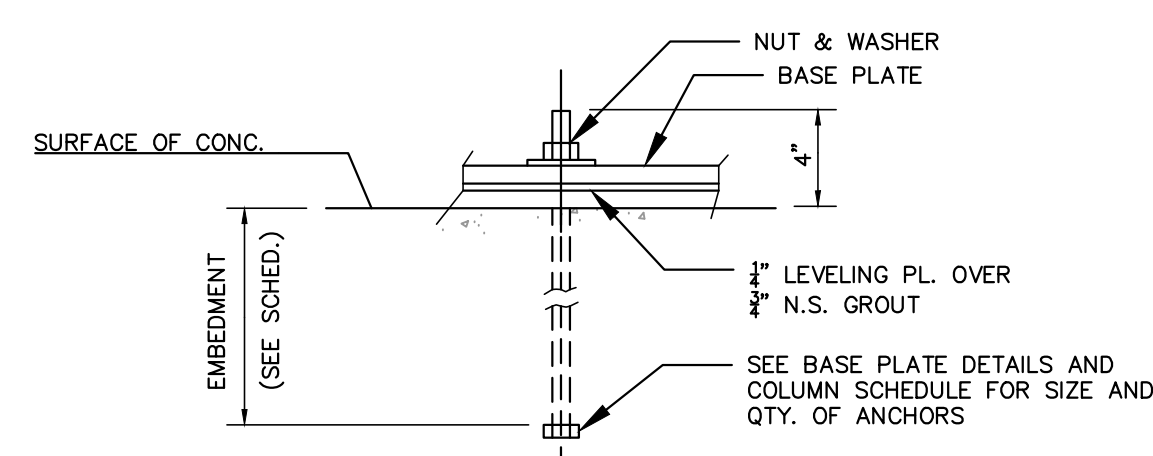


7 TYPICAL PIER ELEVATION  
SCALE: N.T.S.

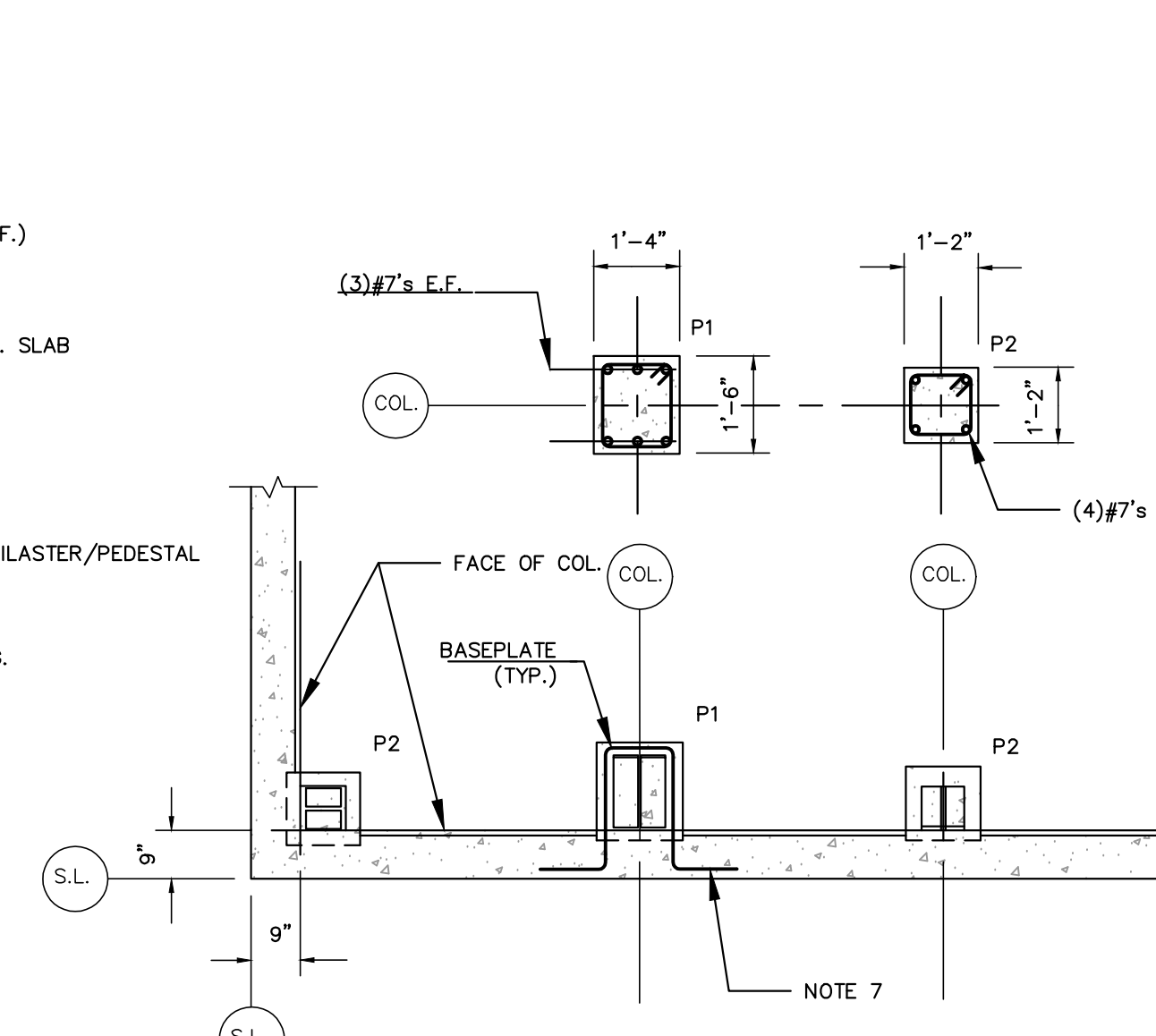
NOTE(S):

- ANCHORS SHALL CONFORM TO ASTM F1554 GRADE 36 UNLESS NOTED OTHERWISE
- CONSULT ENGINEER FOR EMBEDMENT IF GRADE STEEL OR DIAMETERS ARE DIFFERENT THAN LISTED
- ANCHOR BOLTS PROVIDED BY G/C AND INSTALLED BY CONCRETE CONTRACTOR
- ANCHORS SHALL BE HOT-DIPPED GALVANIZED

ANCHOR BOLT SCHEDULE	
DIAMETER [IN.]	EMBEDMENT [IN.]
3/4	18
1	20
1 1/4	24



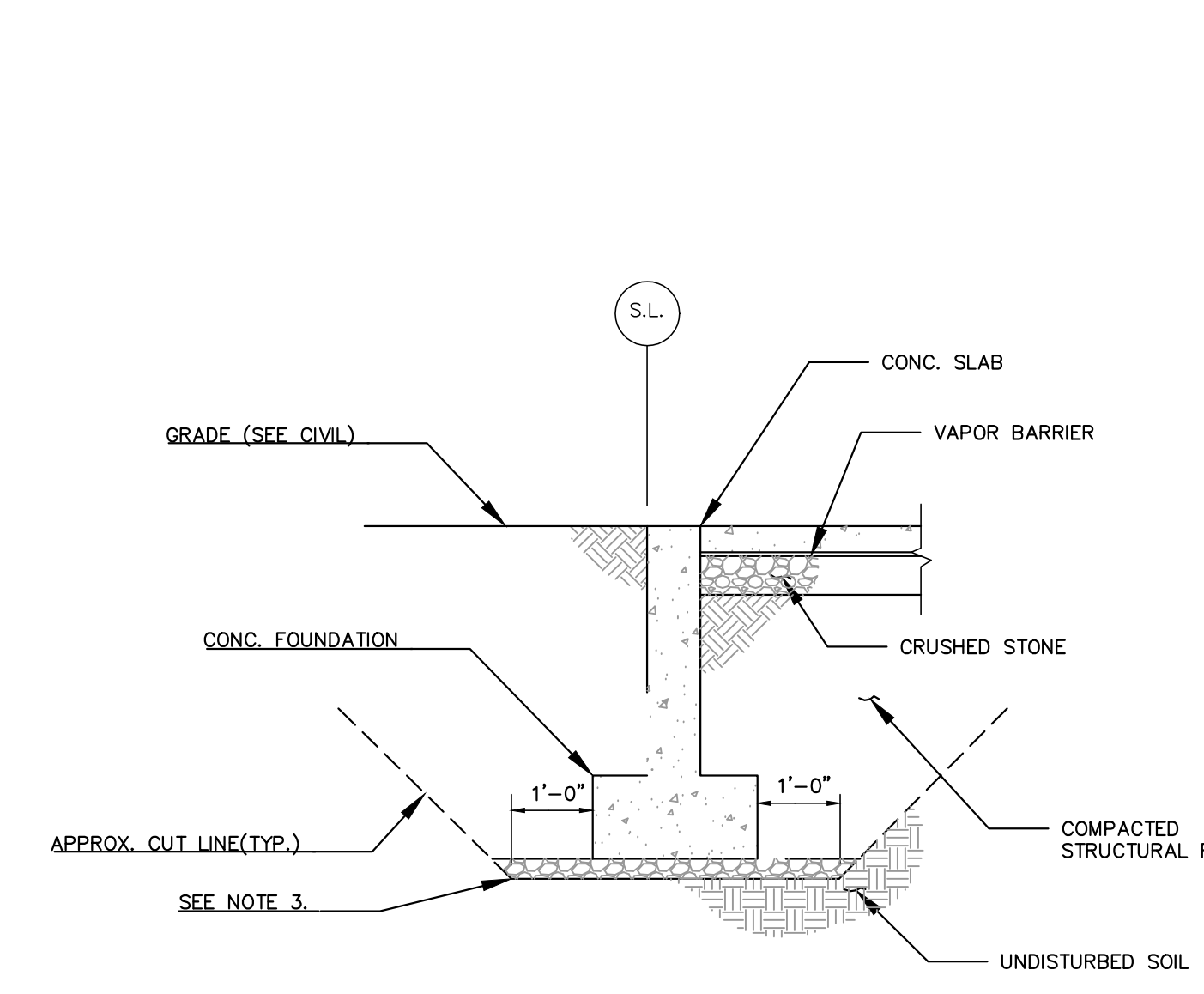
8 ANCHOR DETAIL  
SCALE: 1/2"=1'-0"



6 PIER DETAILS  
SCALE: N.T.S.

PIER NOTE(S):

- FINAL LOCATIONS OF PIERS SHALL BE COORDINATED WITH APPROVED METAL BUILDING SHOP DRAWINGS. PIERS SHALL BE CENTERED BELOW COLUMN SECTION AT THE BASE PLATE LEVEL
- METAL BUILDING BASE PLATES SHALL BE DESIGNED TO FIT ON AND WITHIN PIER DIMENSIONS SHOWN ABOVE. ANY PIER MODIFICATIONS WILL BE AT COST OF THE CONTRACTOR. PIER MODIFICATION (IF REQUIRED) SHALL BE DESIGNED AND STAMPED BY STRUCTURAL ENGINEER LICENSED TO PRACTICE IN THE COMMONWEALTH OF MASSACHUSETTS.
- ANCHOR RODS SHALL RESIDE WITHIN REINFORCING TIES AND SHALL BE A MINIMUM OF 7x BOLT DIAMETER FROM EDGE OF PILASTER/FOUNDATION.
- A MINIMUM OF (4) LONGITUDINAL REINFORCING BARS IN THE PILASTER SHALL HAVE A STANDARD HOOK AT THE TOP AND BOTTOM.
- WALL REINFORCING SHALL PASS CONTINUOUSLY THROUGH THE PEDESTAL
- TIES SHALL BE #3 @ 12" VERTICALLY WITH 3 TIES LOCATED WITHIN THE TOP 5" ON THE PIER.
- WHERE DIMENSIONS CONTROL GEOMETRY SO THAT PILASTERS SEPARATE FROM THE WALL, THE PIER SHALL BE CAST INTEGRAL WITH THE WALL AND BARS BE PROVIDED AS SHOWN TO MATCH WALL REINFORCING AND SPACING.
- PIERS SUPPORTING PORTAL FRAMES ARE TURNED 90 DEGREES IN PLAN, SEE PLAN FOR REQUIRED ORIENTATIONS.
- MEZZANINE COLUMNS MAY BE OFFSET FROM THE FOUNDATION WALL AS APPROVED BY THE ENGINEER TO ACCOMMODATE FRAMING REQUIREMENTS.



5 TYPICAL CUT/FILL DETAIL  
SCALE: N.T.S.

FOUNDATION NOTE(S):

- UNDOCUMENTED FILL AND LOOSE OR DISTURBED SOILS SHALL BE REMOVED FROM ALL FOUNDATION AREAS. THE CONTRACTOR SHALL CONTACT THE ENGINEER PRIOR TO FOUNDATION CONSTRUCTION TO INSPECT ALL FOUNDATION SUBGRADES.
- 3-INCHES OF CRUSHED STONE SHALL BE PLACED AND COMPACTED AT THE BASE OF FOOTING EXCAVATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR SUBGRADE PROTECTION.
- ALL SUBGRADE SHALL BE PROOF COMPARED WITH A MINIMUM OF 3 PASSES OF A VIBRATORY PLATE COMPACTOR UNDER SUPERVISION OF THE ENGINEER.
- GROUNDWATER CONTROL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL FOUNDATION WORK SHALL BE PERFORMED IN THE DRY. SEE GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION

SLAB NOTE(S):

- A MINIMUM OF 6 INCHES CLEAN ANGULAR CRUSHED STONE WITH NO MORE THAN 6% PASSING A #200 SIEVE SHALL BE PLACED BELOW SLABS. THE CONTRACTOR SHALL CONTACT THE ENGINEER PRIOR TO PLACEMENT OF UNDERSLAB STONE FOR SUBGRADE EVALUATION. UNDERSLAB STONE SHALL BE COMPACTED TO 95% COMPACTION RELATIVE TO ASTM D1557 AND SHALL BE PROOF ROLLED AS WELL
- ANY AREAS CONTAMINATED WITH FINES OR DEBRIS SHALL BE REMOVED AND PLACED WITH CLEAN STONE
- IF UNDERSLAB STONE IS TRAPPING WATER, THE WATER SHALL BE REMOVED PRIOR TO SLAB PLACEMENT

CERTIFICATION:

STATUS:

ENGINEER:



Ayer DPW  
25 Brook Street  
Ayer, Massachusetts

REVISIONS:

MARK	DATE	DESCRIPTION

PROJECT:

PRE-ENGINEERED GARAGE  
AT GROVE POND WATER  
TREATMENT PLANT

FILE NAME:  
S:\1-PROJECTS\Garages - Parks and  
Water Depts\Water\Figures\S-1.DWG

AUTHOR: DAN VAN SCHALKWYK, P.E.  
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DATE: JUNE 2016

SHEET TITLE:  
GENERAL NOTES  
AND TYPICAL  
DETAILS

SHEET:

SCHEMATIC DESIGN –  
NOT FOR  
CONSTRUCTION

S300



No.	Date	Notes

HVAC LEGEND:

DUCTWORK LEGEND	ABBREVIATIONS	GENERAL NOTES																																																																																																																																				
RECTANGULAR DUCTWORK - FIRST DIMENSION IS SIDE SHOWN (IN.) ROUND DUCTWORK - DIMENSION IS DUCT DIAMETER (IN.) 1/2" WIRE MESH SCREEN (ON OPEN END DUCT)	<p><b>ABBREVIATIONS</b></p> <table border="0"> <tr><td>AFF</td><td>ABOVE FINISHED FLOOR</td><td>GAL</td><td>GALLONS</td></tr> <tr><td>ARCH.</td><td>ARCHITECT</td><td>GC</td><td>GENERAL CONTRACTOR</td></tr> <tr><td>BD</td><td>BOTTOM OF DUCT</td><td>GE</td><td>GENERAL EXHAUST</td></tr> <tr><td>BTU</td><td>BRITISH THERMAL UNIT</td><td>GPM</td><td>GALLONS PER MINUTE</td></tr> <tr><td>BTUH</td><td>BRITISH THERMAL UNIT PER HOUR</td><td>GHM</td><td>GAS FIRED UNIT HEATER</td></tr> <tr><td>C</td><td>CLOSED</td><td>HC</td><td>HEATING COIL</td></tr> <tr><td>CA</td><td>COMBUSTION AIR</td><td>HP</td><td>HORSE POWER</td></tr> <tr><td>CAP</td><td>CAPACITY</td><td>HVAC</td><td>HEATING, VENTILATION AND AIR CONDITIONING</td></tr> <tr><td>CAR</td><td>COMBUSTION AIR RELIEF</td><td>IN</td><td>INCHES</td></tr> <tr><td>CAS</td><td>COMBUSTION AIR SUPPLY</td><td>KW</td><td>KILOWATTS</td></tr> <tr><td>CFM</td><td>CUBIC FEET PER MINUTE</td><td>LAT</td><td>LEAVING AIR TEMPERATURE</td></tr> <tr><td>CO</td><td>CLEAN OUT</td><td>MBH</td><td>THOUSANDS OF BRITISH THERMAL UNITS PER HOUR</td></tr> <tr><td>CONTR</td><td>CONTRACTOR</td><td>MECH</td><td>MECHANICAL</td></tr> <tr><td>CP</td><td>CONTROL PANEL</td><td>NC</td><td>NORMALLY CLOSED</td></tr> <tr><td>CT</td><td>CURRENT TRANSFORMER</td><td>NIC</td><td>NOT IN CONTRACT</td></tr> <tr><td>CV</td><td>CONTROL VALVE</td><td>NO</td><td>NORMALLY OPEN</td></tr> <tr><td>DB</td><td>DRY BULB TEMPERATURE (°F)</td><td>NTS</td><td>NOT TO SCALE</td></tr> <tr><td>DDC</td><td>DIRECT DIGITAL CONTROL</td><td>OA</td><td>OUTSIDE AIR</td></tr> <tr><td>DO</td><td>DIGITAL OUTPUT</td><td>OAT</td><td>OUTSIDE AIR TEMPERATURE</td></tr> <tr><td>DWG</td><td>DRAWING</td><td>PC</td><td>PLUMBING CONTRACTOR</td></tr> <tr><td>EA</td><td>EACH</td><td>PD</td><td>PRESSURE DROP</td></tr> <tr><td>EA</td><td>EXHAUST AIR</td><td>PSI</td><td>POUNDS PER SQUARE INCH</td></tr> <tr><td>EAT</td><td>ENTERING AIR TEMPERATURE</td><td>RM</td><td>ROOM</td></tr> <tr><td>EC</td><td>ELECTRICAL CONTRACTOR</td><td>SDC</td><td>STAND ALONE DIGITAL CONTROLLER</td></tr> <tr><td>EF</td><td>EXHAUST FAN</td><td>SF</td><td>SQUARE FEET</td></tr> <tr><td>ESP</td><td>EXTERNAL STATIC PRESSURE</td><td>SP</td><td>STATIC PRESSURE</td></tr> <tr><td>FA</td><td>FREE AREA</td><td>SPD</td><td>SPEED</td></tr> <tr><td>FAI</td><td>FRESH AIR INTAKE</td><td>SS</td><td>STAINLESS STEEL</td></tr> <tr><td>FLA</td><td>FULL LOAD AMPS</td><td>TSTAT</td><td>THERMOSTAT</td></tr> <tr><td>FLD</td><td>FLOOR DRAIN</td><td>TYP</td><td>TYPICAL</td></tr> <tr><td>FFM</td><td>FEET PER MINUTE</td><td>VFD</td><td>VARIABLE FREQUENCY DRIVE</td></tr> <tr><td>FSD</td><td>COMBINATION FIRE AND SMOKE DAMPER</td><td>WB</td><td>WET BULB TEMPERATURE (°F)</td></tr> <tr><td>FT</td><td>FEET</td><td>WMS</td><td>WIRE MESH SCREEN</td></tr> </table>	AFF	ABOVE FINISHED FLOOR	GAL	GALLONS	ARCH.	ARCHITECT	GC	GENERAL CONTRACTOR	BD	BOTTOM OF DUCT	GE	GENERAL EXHAUST	BTU	BRITISH THERMAL UNIT	GPM	GALLONS PER MINUTE	BTUH	BRITISH THERMAL UNIT PER HOUR	GHM	GAS FIRED UNIT HEATER	C	CLOSED	HC	HEATING COIL	CA	COMBUSTION AIR	HP	HORSE POWER	CAP	CAPACITY	HVAC	HEATING, VENTILATION AND AIR CONDITIONING	CAR	COMBUSTION AIR RELIEF	IN	INCHES	CAS	COMBUSTION AIR SUPPLY	KW	KILOWATTS	CFM	CUBIC FEET PER MINUTE	LAT	LEAVING AIR TEMPERATURE	CO	CLEAN OUT	MBH	THOUSANDS OF BRITISH THERMAL UNITS PER HOUR	CONTR	CONTRACTOR	MECH	MECHANICAL	CP	CONTROL PANEL	NC	NORMALLY CLOSED	CT	CURRENT TRANSFORMER	NIC	NOT IN CONTRACT	CV	CONTROL VALVE	NO	NORMALLY OPEN	DB	DRY BULB TEMPERATURE (°F)	NTS	NOT TO SCALE	DDC	DIRECT DIGITAL CONTROL	OA	OUTSIDE AIR	DO	DIGITAL OUTPUT	OAT	OUTSIDE AIR TEMPERATURE	DWG	DRAWING	PC	PLUMBING CONTRACTOR	EA	EACH	PD	PRESSURE DROP	EA	EXHAUST AIR	PSI	POUNDS PER SQUARE INCH	EAT	ENTERING AIR TEMPERATURE	RM	ROOM	EC	ELECTRICAL CONTRACTOR	SDC	STAND ALONE DIGITAL CONTROLLER	EF	EXHAUST FAN	SF	SQUARE FEET	ESP	EXTERNAL STATIC PRESSURE	SP	STATIC PRESSURE	FA	FREE AREA	SPD	SPEED	FAI	FRESH AIR INTAKE	SS	STAINLESS STEEL	FLA	FULL LOAD AMPS	TSTAT	THERMOSTAT	FLD	FLOOR DRAIN	TYP	TYPICAL	FFM	FEET PER MINUTE	VFD	VARIABLE FREQUENCY DRIVE	FSD	COMBINATION FIRE AND SMOKE DAMPER	WB	WET BULB TEMPERATURE (°F)	FT	FEET	WMS	WIRE MESH SCREEN	<p><b>GENERAL NOTES</b></p> <ol style="list-style-type: none"> <li>MECHANICAL WORK INDICATED IS DIAGRAMMATIC. EXACT LOCATIONS OF ALL COMPONENTS ARE TO BE DETERMINED IN THE FIELD (SPACING SUBJECT TO ARCHITECT'S REVIEW AND APPROVAL) TO AVOID CONFLICT WITH OTHER TRADES AND EXISTING SITE CONDITIONS.</li> <li>THE CONTRACTOR SHALL VISIT AND CAREFULLY EXAMINE THE SITE TO IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE WORK OF THIS SECTION. REPORT IN WRITING TO THE ARCHITECT CONDITIONS WHICH MIGHT ADVERSELY AFFECT WORK. NO EXTRA PAYMENT WILL BE PROVIDED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY AN EXPERIENCED OBSERVER.</li> <li>WORK REQUIRING INTERRUPTION OF BUILDING SERVICES SHALL BE CAREFULLY REVIEWED AND COORDINATED WITH THE OWNER TO MINIMIZE FREQUENCY AND DURATION OF SERVICE INTERRUPTIONS.</li> <li>REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION OF CEILING GRID, DIFFUSERS, AND GRILLES.</li> <li>ALL INSTALLATIONS SHALL PERMIT AND PROVIDE ACCESSIBILITY FOR SERVICE AND REPLACEMENT OF ALL NEW EQUIPMENT AND EXISTING EQUIPMENT IMPACTED BY THIS WORK.</li> <li>COORDINATE ALL ROOF OPENINGS WITH ARCHITECT AND STRUCTURAL ENGINEER.</li> <li>REFER TO STRUCTURAL FRAMING PLANS FOR EXACT LOCATION OF ALL ROOF MOUNTED EQUIPMENT.</li> <li>ALL MECHANICAL EQUIPMENT, PIPING, AND DUCTWORK SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF GOVERNING LOCAL, STATE, AND FEDERAL SEISMIC CODES. PARTICULAR ATTENTION SHALL BE MADE TO VIBRATION ISOLATION, ANCHORING, AND BALANCING REQUIREMENTS.</li> <li>INSTALL SMOKE DETECTORS WHERE SHOWN ON THE ELECTRICAL DRAWINGS. COORDINATE THE LOCATION WITH SHEET METAL SHOP DRAWINGS, TO BE PRODUCED BY MECHANICAL CONTRACTOR, AND APPROVED BY ENGINEER. ELECTRICAL CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN SUPPLY AND RETURN DUCTS ON ALL AIR HANDLERS AND ROOFTOP UNITS AS SHOWN ON THE ELECTRICAL DRAWINGS.</li> <li>ALL DUCTWORK SHALL BE INSTALLED IN ACCORDANCE WITH CODES AND STANDARDS SET FORTH IN NFPA, SMACNA, AND ASHRAE FOR MEDIUM AND LOW PRESSURE DUCTWORK SYSTEMS.</li> <li>ALL SHEET METAL PLENUMS AT OUTSIDE AIR LOUVERS SHALL BE INSULATED WITH RIGID INSULATION, AS PER SPECIFICATION.</li> <li>ALL DUCTS AND EQUIPMENT SHALL BE INDEPENDENTLY SUPPORTED FROM THE BUILDING STRUCTURE WITH PROPER ALLOWANCES FOR CONTRACTION, EXPANSION, AND VIBRATION ELIMINATION.</li> <li>ROOM THERMOSTATS SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR UNLESS OTHERWISE SHOWN OR DIRECTED.</li> <li>ALL DUCT DIMENSIONS SHOWN ARE INSIDE CLEAR FREE AREA REQUIRED.</li> <li>NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED ON THIS PROJECT.</li> <li>COORDINATE ENTIRE INSTALLATION WITH THE WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATIONS.</li> <li>OBTAIN ALL REQUIRED PERMITS AND PAY ALL FEES RELATED TO SAME.</li> <li>ALL DUCTWORK SHOWN IS DIAGRAMMATIC ONLY. DETERMINE THE EXACT LOCATION IN THE FIELD.</li> <li>REVIEW ALL ARCHITECTURAL, STRUCTURAL, PLUMBING, ELECTRICAL, FIRE PROTECTION AND SITE DRAWINGS BEFORE STARTING ANY WORK TO BECOME FAMILIAR WITH THE DETAILS OF CONSTRUCTION, AND COORDINATE WITH OTHER TRADES.</li> <li>PROVIDE ALL NECESSARY PIPING, EQUIPMENT AND SUPPORTS AS WELL AS ANY ADDITIONAL EQUIPMENT, ETC. NOT SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS BUT NECESSARY TO PROVIDE COMPLETE AND WORKABLE SYSTEMS.</li> <li>PROVIDE ACCESS TO ALL EQUIPMENT REQUIRING PERIODIC SERVICE AND MAINTENANCE.</li> <li>DO NOT SCALE THESE DRAWINGS. TAKE ALL MEASUREMENTS IN THE FIELD IN COORDINATION WITH ALL EQUIPMENT AS APPROVED AND WITH ALL OTHER TRADES.</li> <li>ALL DUCTWORK SHALL BE INSTALLED ON ACCORDANCE WITH THE LATEST EDITION OF SMACNA</li> <li>ALL ROTATING EQUIPMENT SHALL HAVE FLEXIBLE PIPE ON DUCT CONNECTIONS AND APPROVED VIBRATION ISOLATORS.</li> <li>PROVIDE AIRTIGHT ACCESS DOOR FOR INSPECTION OF FIRE DAMPERS, FILTERS, AND COILS.</li> <li>CONTRACTOR SHALL VERIFY DUCT, PIPING AND EQUIPMENT LOCATIONS FOR INTERFERENCES BEFORE INSTALLATION.</li> <li>FOR EQUIPMENT SCHEDULES, SEE DRAWING M100.</li> <li>DETAILS SHOWN ON SHEET M200 ARE APPLICABLE TO ALL EQUIPMENT, EXCEPT WHERE INDICATED.</li> <li>REFERENCE DRAWING M200 FOR SEQUENCE OF OPERATION OF NEW EQUIPMENT.</li> <li>ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.</li> </ol>
AFF	ABOVE FINISHED FLOOR	GAL	GALLONS																																																																																																																																			
ARCH.	ARCHITECT	GC	GENERAL CONTRACTOR																																																																																																																																			
BD	BOTTOM OF DUCT	GE	GENERAL EXHAUST																																																																																																																																			
BTU	BRITISH THERMAL UNIT	GPM	GALLONS PER MINUTE																																																																																																																																			
BTUH	BRITISH THERMAL UNIT PER HOUR	GHM	GAS FIRED UNIT HEATER																																																																																																																																			
C	CLOSED	HC	HEATING COIL																																																																																																																																			
CA	COMBUSTION AIR	HP	HORSE POWER																																																																																																																																			
CAP	CAPACITY	HVAC	HEATING, VENTILATION AND AIR CONDITIONING																																																																																																																																			
CAR	COMBUSTION AIR RELIEF	IN	INCHES																																																																																																																																			
CAS	COMBUSTION AIR SUPPLY	KW	KILOWATTS																																																																																																																																			
CFM	CUBIC FEET PER MINUTE	LAT	LEAVING AIR TEMPERATURE																																																																																																																																			
CO	CLEAN OUT	MBH	THOUSANDS OF BRITISH THERMAL UNITS PER HOUR																																																																																																																																			
CONTR	CONTRACTOR	MECH	MECHANICAL																																																																																																																																			
CP	CONTROL PANEL	NC	NORMALLY CLOSED																																																																																																																																			
CT	CURRENT TRANSFORMER	NIC	NOT IN CONTRACT																																																																																																																																			
CV	CONTROL VALVE	NO	NORMALLY OPEN																																																																																																																																			
DB	DRY BULB TEMPERATURE (°F)	NTS	NOT TO SCALE																																																																																																																																			
DDC	DIRECT DIGITAL CONTROL	OA	OUTSIDE AIR																																																																																																																																			
DO	DIGITAL OUTPUT	OAT	OUTSIDE AIR TEMPERATURE																																																																																																																																			
DWG	DRAWING	PC	PLUMBING CONTRACTOR																																																																																																																																			
EA	EACH	PD	PRESSURE DROP																																																																																																																																			
EA	EXHAUST AIR	PSI	POUNDS PER SQUARE INCH																																																																																																																																			
EAT	ENTERING AIR TEMPERATURE	RM	ROOM																																																																																																																																			
EC	ELECTRICAL CONTRACTOR	SDC	STAND ALONE DIGITAL CONTROLLER																																																																																																																																			
EF	EXHAUST FAN	SF	SQUARE FEET																																																																																																																																			
ESP	EXTERNAL STATIC PRESSURE	SP	STATIC PRESSURE																																																																																																																																			
FA	FREE AREA	SPD	SPEED																																																																																																																																			
FAI	FRESH AIR INTAKE	SS	STAINLESS STEEL																																																																																																																																			
FLA	FULL LOAD AMPS	TSTAT	THERMOSTAT																																																																																																																																			
FLD	FLOOR DRAIN	TYP	TYPICAL																																																																																																																																			
FFM	FEET PER MINUTE	VFD	VARIABLE FREQUENCY DRIVE																																																																																																																																			
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HVAC SCHEDULE:

TAG No.	LOCATION(S) SERVED	MANUFACTURER	MODEL No.	TYPE	AIR DATA		ELECTRIC CAPACITY		ELECTRICAL DATA			REMARKS	
					CFM	EAT(°F)	MBH	KW	VOLTS	PHASE	HZ		
						LAT(°F)							
EUH-1	GARAGE	QMARK	MUH158	HORIZONTAL	910	55	85	51.2	15	208	3	60	PROVIDE WALL MOUNTING BRACKETS, T'STAT, DISCONNECT SWITCH
EUH-2	GARAGE	QMARK	MUH158	HORIZONTAL	910	55	85	51.2	15	208	3	60	PROVIDE WALL MOUNTING BRACKETS, T'STAT, DISCONNECT SWITCH
EUH-3	GARAGE	QMARK	MUH158	HORIZONTAL	910	55	85	51.2	15	208	3	60	PROVIDE WALL MOUNTING BRACKETS, T'STAT, DISCONNECT SWITCH

NOTES:  
1. COORDINATE FINISH & COLOR WITH ARCHITECT.

LOCATION	INSULATION TYPE	FITTING INSULATION TYPE	FOR PIPE DIA. (INCHES)			
			INSULATION WALL THICKNESS (INCHES)			
			RUNOUTS	< 1 1/2"	2"-2 1/2"	3"-6"
OUTSIDE AIR LOUVER INSULATION	2" FIBERGLASS DUCT WRAP WITH FSK FACING					
EXHAUST DUCT INSULATION		NONE				

TAG No.	LOCATION(S) SERVED	MANUFACTURER (AS STANDARD)	MODEL No. (AS STANDARD)	TYPE	FAN DATA			ELECTRICAL DATA			REMARKS
					CFM	RPM	SP(N)	VOLTS	PHASE	HP	
EF-1	GARAGE	GREENHECK	SQ-70-VG	INLINE	100	972	0.1	115	1	1/10	PROVIDE WITH DISCONNECT, ECM, INLET GUARD, HANGERS, AND SPRING VIBRATION ISOLATORS
EF-2	GARAGE	GREENHECK	SQ-130-VG	INLINE	1400	1188	0.1	115	1	3/4	PROVIDE WITH DISCONNECT, ECM, INLET GUARD, HANGERS, AND SPRING VIBRATION ISOLATORS

PREPARED FOR:

Department of Public Works  
25 Brook Street  
Ayer, MA  
(978) 772-8240

PROJECT TITLE  
**Ayer DPW Garage**  
**Grove Pond WTP**  
**Barnum Road**  
**DESIGN DEVELOPMENT**

**BLW**  
BLW Engineers, Inc.  
311 Great Road, Post Office Box 1551  
Littleton, Massachusetts 01460  
T: 978-456-4301 F: 978-428-0067  
www.blwengineers.com  
HVAC • ELECTRICAL • PLUMBING • FIRE PROTECTION

PROJECT ARCHITECT:  
**WILLIAM SLOAN ASSOCIATES**

551 MAIN STREET WINCHESTER, MA 01890 781-729-2910

STRUCTURAL ENGINEER:

MECHANICAL ENGINEER

ELECTRICAL ENGINEER

Issues / Revisions

No.	Date	Notes

Designed By

Project Manager

Drawn By

Date 05/20/16

Drawing Title

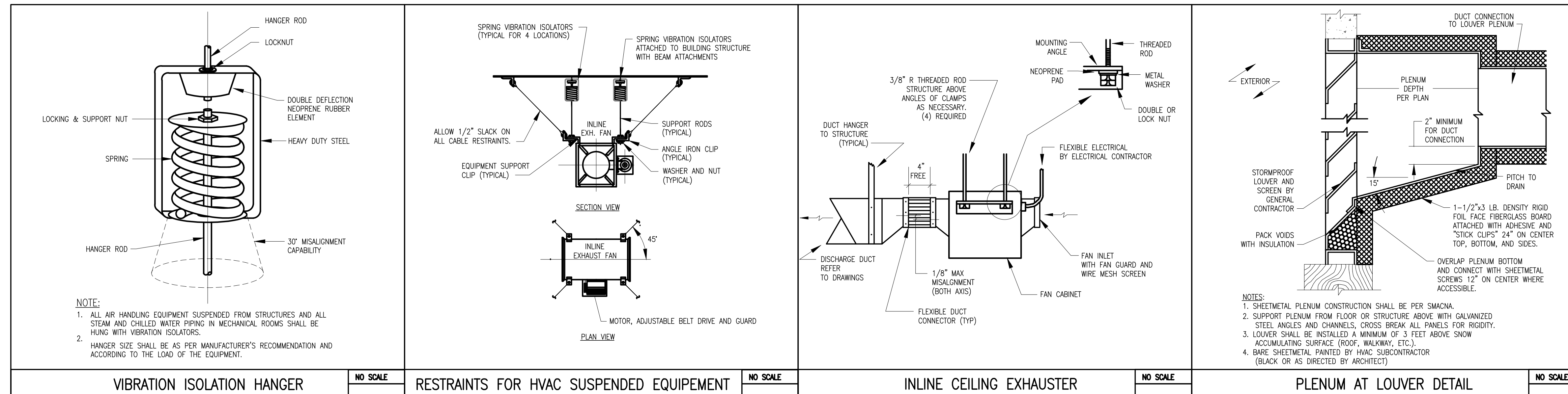
**MECHANICAL  
DETAILS AND  
SEQUENCES**

Scale N.T.S.

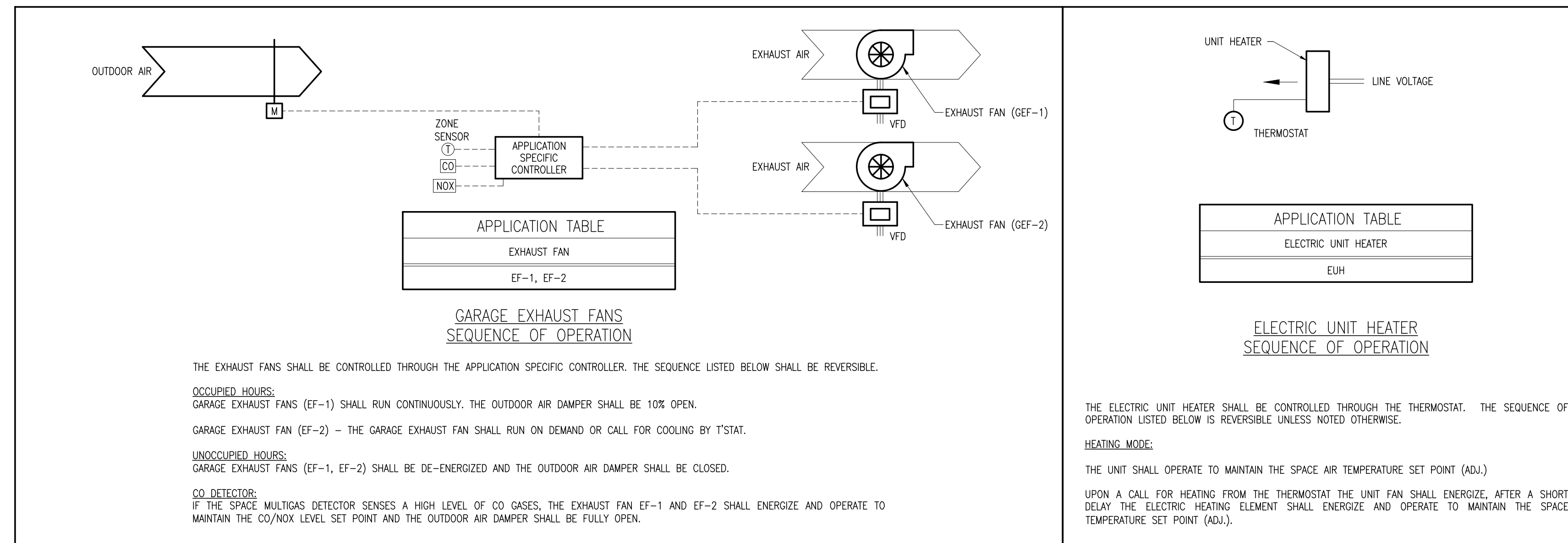
Drawing No.

**M101**

HVAC DETAILS:



HVAC SCHEDULE:



PROGRESS – NOT FOR  
CONSTRUCTION

PREPARED FOR:

Department of Public Works  
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STRUCTURAL ENGINEER:

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ELECTRICAL ENGINEER:

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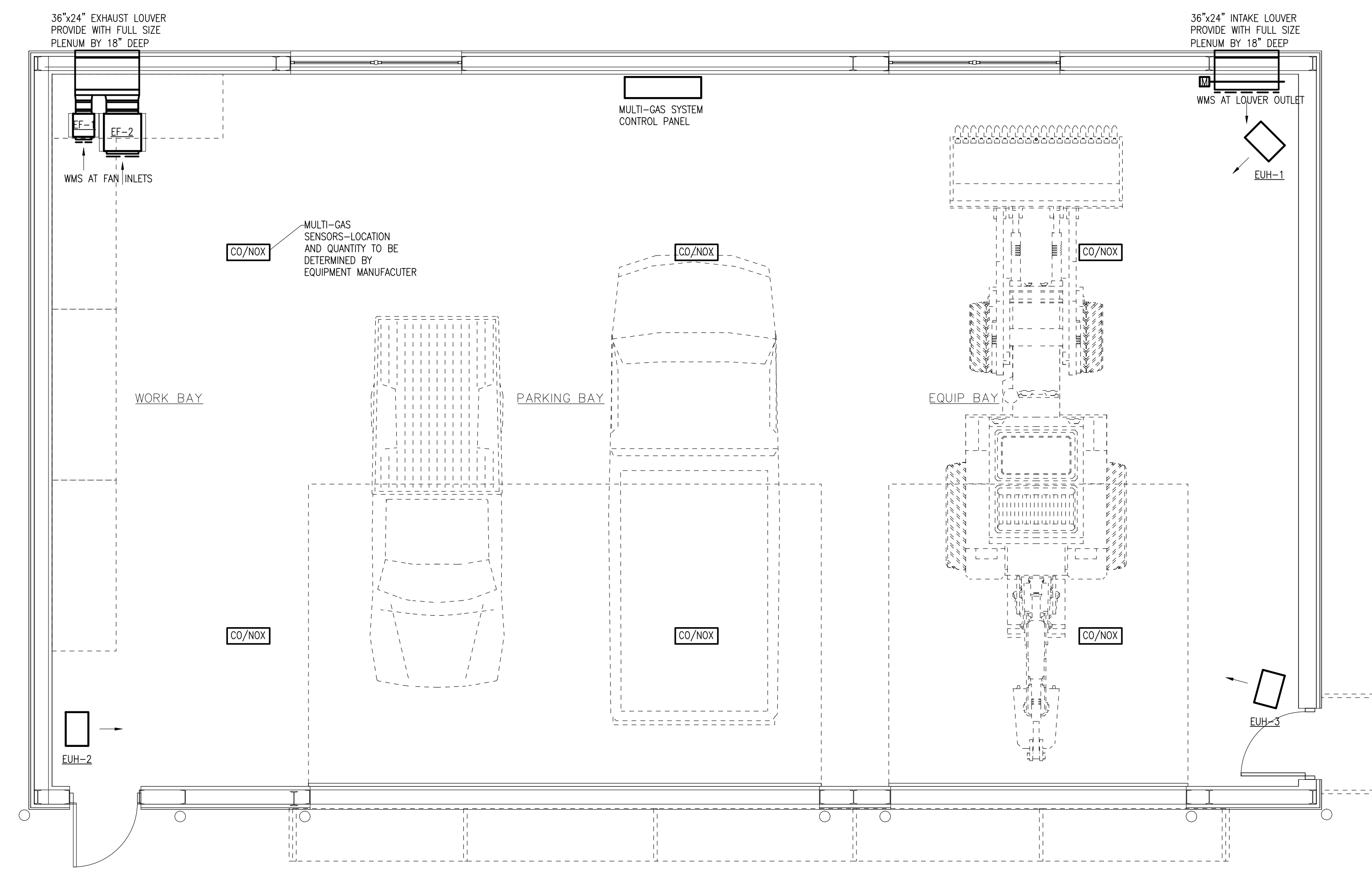
Drawing Title

**MECHANICAL  
FLOOR PLAN**

Scale 1/4"=1'-0"

Drawing No.

**M200**



PROGRESS — NOT FOR  
CONSTRUCTION

**GENERAL SPECIFICATIONS**

- THESE DRAWINGS AND PERFORMANCE SPECIFICATIONS ARE NOT FOR CONSTRUCTION, BUT SHALL BE UTILIZED BY CONTRACTORS TO PROVIDE A BID PROPOSAL IN ANSWER TO THE TOWN'S RFPF.
- CONDITIONS OF THE CONTRACT AND DIVISION 1, GENERAL REQUIREMENTS APPLY TO WORK SHOWN ON THESE DRAWINGS. EXAMINE DRAWINGS AND OTHER SPECIFICATIONS THAT AFFECT WORK SHOWN ON THESE DRAWINGS.
- PROVIDE ITEMS REFERRED TO IN SINGULAR NUMBER IN CONTRACT DOCUMENTS IN QUANTITIES NECESSARY TO COMPLETE WORK.
- VISIT SITE AND EXAMINE CONDITIONS UNDER WHICH WORK MUST BE PERFORMED. REPORT ADVERSE CONDITIONS IN WRITING TO ARCHITECT. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS COMPLETE ACCEPTANCE OF EXISTING CONDITIONS INCLUDING PREPARATORY WORK DONE BY OTHERS.
- PERFORM WORK AND PROVIDE MATERIALS AND EQUIPMENT AS SHOWN ON DRAWINGS. COORDINATE ELECTRICAL WORK WITH WORK SHOWN ON THESE DRAWINGS.
- GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND BACK CHARGES, AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION.
- PERFORM WORK AS REQUIRED BY CODES, REGULATIONS AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENTS AND OTHER AUTHORITIES WITH LAWFUL JURISDICTION.
- MATERIAL AND EQUIPMENT SHALL BE UL, NEMA, ANSI, IEEE, ADA & CSM APPROVED FOR INTENDED SERVICE. MATERIAL AND INSTALLATION SHALL MEET REQUIREMENTS OF NATIONAL AND STATE ELECTRICAL CODE.
- MAINTAIN RECORD DRAWINGS ON SITE. RECORD SET MUST BE COMPLETE, CURRENT AND AVAILABLE FOR INSPECTION WHEN REQUESTIONS FOR PAYMENT ARE SUBMITTED.
- GUARANTEE WORK IN WRITING FOR ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE. REPAIR OR REPLACE DEFECTIVE MATERIALS OR INSTALLATION AT NO COST TO OWNER. CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE AT NO COST TO OWNER.
- SUBMIT GUARANTEE TO ARCHITECT BEFORE FINAL PAYMENT. STATEMENT OF GUARANTEE REQUIREMENTS SHALL NOT BE INTERPRETED TO LIMIT OWNER'S RIGHTS UNDER LAW AND THIS CONTRACT.
- DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. PROVIDE INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS BUT NOT SHOWN ON PLANS, AND VICE VERSA, AS IF EXPRESSLY REQUIRED ON BOTH.
- UTILIZE MOLDED CASE CIRCUIT BREAKERS. MINIMUM INTERRUPTING CAPACITY SHALL BE 10,000 AMPS SYMMETRICAL AT 240 VOLTS.
- TEMPORARY LIGHT AND POWER SHALL BE PROVIDED ON SITE BY THE ELECTRICAL CONTRACTOR. COST OF ELECTRICITY SHALL BE THE RESPONSIBILITY OF THE TOWN OF AYER.
- ADDRESS QUESTIONS REGARDING DRAWINGS TO ENGINEER IN WRITING BEFORE AWARD OF CONTRACT. OTHERWISE, ENGINEER'S INTERPRETATION OF MEANING AND INTENT OF DRAWINGS SHALL BE FINAL.
- SUBMIT SHOP DRAWINGS AND PRODUCT DATA WITHIN THIRTY (30) DAYS AFTER AWARD OF CONTRACT. CHECK, STAMP AND MARK WITH PROJECT NAMES SUBMITTALS BEFORE TRANSMITTING TO ARCHITECT. INDICATE DEVIATIONS FROM CONTRACT DOCUMENTS. SHOP DRAWINGS SHALL BE PROVIDED FOR ALL EQUIPMENT SHOWN ON THE DRAWINGS. PROVIDE SHOP DRAWINGS ON LIGHTING, PANELBOARDS, CIRCUIT BREAKERS, CONDUIT, WIRING DEVICES, LIGHTING CONTROL DEVICES, CABLE AND CONDUCTORS, EQUIPMENT CUTS AND DISCONNECTS.
- ALL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, RECTILINEAR TO BUILDING STRUCTURE.
- LOCATION OF MECHANICAL EQUIPMENT THAT REQUIRE ELECTRICAL CONNECTIONS ARE SHOWN ON THE MECHANICAL DRAWINGS.
- CONDUIT HOMERUNS SHOWN ON THE DRAWING WITH MORE THAN THREE (3) CURRENT CARRYING CONDUCTORS ARE SHOWN DIAGRAMMATICALLY. NOT INSTALL MORE THAN THREE (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY UNLESS DONE SO STRICTLY BY THE NATIONAL ELECTRICAL CODE AS AMENDED BY THE STATE.
- THE ELECTRICAL CONTRACTOR SHALL CONSULT AND COOPERATE WITH CONTRACTORS OF OTHER TRADES TO AVOID ANY INTERFERENCE IN THE INSTALLATION OF THEIR RESPECTIVE EQUIPMENT. CONTRACTOR SHALL REVIEW ALL TRADES' CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR ELECTRICAL EQUIPMENT. COORDINATE EXACT MOUNTING LOCATIONS WITH THE ARCHITECT.
- BRANCH CIRCUIT WIRING MAY NOT BE SHOWN GRAPHICALLY ON DRAWINGS AND MAY BE INDICATED BY CIRCUIT NUMBERS BESIDE FIXTURES, DEVICES AND EQUIPMENT. PROVIDE COMPLETE WIRING SYSTEM WHETHER OR NOT INDICATED GRAPHICALLY. PHASE, BALANCE ALL PANELBOARDS IN FIELD. CIRCUIT NUMBERS ARE DIAGRAMMATIC, UTILIZE AVAILABLE SPACE OR PROVIDE ADDITIONAL BREAKERS AND PANELBOARDS AS NECESSARY.
- ALL NEW WIRING SHALL BE TYPE THHN/THWN RATED 75-90°C, 600V. WET-DRY LOCATIONS. MINIMUM BRANCH CIRCUIT WIRING SHALL BE NO. 12 AWG SOLID COPPER. BRANCH CIRCUITS LONGER THAN 75 FEET FOR 120 VOLTS OR 175 FEET FOR 277 VOLTS SHALL BE AT LEAST NO. 10 AWG FROM PANEL TO LAST OUTLET.
- ALL NEW EXPOSED INTERIOR WIRING ABOVE 8'-0" NOT EXPOSED TO DAMAGE SHALL BE INSTALLED IN ELECTRIC METALLIC TUBING. ALL WIRING IN CONCRETE SLABS OR EXPOSED IN ROOM BELOW 8'-0" OR EXPOSED TO DAMAGE SHALL BE INSTALLED IN RIGID STEEL CONDUIT. EXTERIOR WIRING SHALL BE IN GALVANIZED RIGID METALLIC CONDUIT.
- ALL GROUNDING SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AS AMENDED BY THE STATE OF MASSACHUSETTS.
- ALL FIREPROOFING FOR ELECTRICAL PENETRATIONS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
- SYSTEM FEEDERS AND BRANCH CIRCUITS THAT PASS THROUGH ALTERED AREAS AND SERVE OTHER AREAS SHALL BE MAINTAINED.
- PROVIDE NEW TYPED IDENTIFICATION DIRECTORY IN PANELBOARDS INDICATING CIRCUIT FUNCTION OR EQUIPMENT SERVED. LABEL ALL ELECTRICAL PANELS, DISCONNECT SWITCHES AND OTHER EQUIPMENT WITH ENGRAVED VINYL PLATES. NAMEPLATE LETTERING SHALL BE 1/4" MINIMUM.
- PANELBOARDS SHALL BE DOOR-IN-DOOR CONSTRUCTION WITH COPPER BUS. CIRCUIT BREAKERS SHALL BE THERMAL-MAGNETIC, BOLT-ON, PANELBOARDS AND BREAKERS SHALL BE CUTLER HAMMER, SQUARE D, G.E. OR SIEMENS. PROVIDE TYPE IDENTIFICATION DIRECTORY CARDS IN PANELBOARD INDICATING CIRCUIT FUNCTION OR EQUIPMENT SERVED.
- DISCONNECT SWITCHES SHALL BE HEAVY DUTY (HD), SIDE OPERATED WITH INTERLOCKING COVER, G.E., SQUARE "D", CUTLER HAMMER OR SIEMENS OR EQUAL.

**POWER NOTES**

- ALL CONDUIT, WIRING AND ELECTRICAL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE LATEST STANDARDS OF THE NATIONAL & STATE ELECTRICAL CODES AND ANY APPLICABLE LOCAL REGULATIONS.
- ALL CONDUITS ARE SHOWN DIAGRAMMATICALLY. EXACT LOCATION AND METHOD OF SUPPORT SHALL BE DETERMINED IN THE FIELD, EXCEPT WHERE SPECIFIC DIMENSIONS AND DETAILS ARE SHOWN. ALL CONDUIT RUNS SHALL BE RIGIDLY SUPPORTED.
- NO CONDUIT SMALLER THAN 3/4 INCH ELECTRICAL TRADE SIZE SHALL BE USED, UNLESS SPECIFICALLY CALLED FOR ON THE DRAWINGS.
- PERFORM WORK AND PROVIDE MATERIALS AND EQUIPMENT TO MAKE INSTALLATION COMPLETE IN EVERY DETAIL UNDER THIS CONTRACT WHETHER OR NOT SPECIFICALLY SHOWN ON DRAWINGS.
- WIRING DEVICES SHALL BE SPECIFICATION GRADE, 20 AMP, WITH STAINLESS STEEL DEVICE PLATES AS MANUFACTURED BY HUBBELL, OR EQUAL. COLOR TO MATCH EXISTING OR AS APPROVED BY ARCHITECT.
- CONDUCTORS AND CABLE SHALL BE MINIMUM #12 AWG, 600 VOLT, COPPER WITH TYPE THHN/THWN INSULATION. PROVIDE SEPARATE GREEN GROUND IN ALL FEEDERS. WIRE SIZE #8 AWG AND LARGER SHALL BE STRANDED, #10 AWG AND SMALLER SHALL BE SOLID. COLOR CODE CONDUCTORS BLACK, RED, BLUE, WITH WHITE NEUTRAL AND GREEN GROUND EXCEPT AS NOTED FOR 120 VOLT.
- MOUNTING HEIGHTS OF ELECTRICAL EQUIPMENT SHALL BE AS FOLLOWS UNLESS OTHERWISE NOTED:  
a.) CONVENIENCE RECEPTACLE (GENERAL), 1'-6" FROM FLOOR TO CENTERLINE.

**GENERAL NOTES**

- ALL FLOOR, MASONRY WALLS AND STRUCTURAL CEILING PENETRATIONS SHALL BE SLEEVED.
- PROVIDE FIRE/MOISTURE SEAL FOR WALL, FLOOR OR CEILING PENETRATIONS.
- OUTLET BOXES SHALL BE SURFACE MOUNTED. CONDUIT SHALL BE RUN ON THE SURFACE.
- FLEXIBLE CONDUIT CONNECTIONS SHALL BE A MAXIMUM OF 6'-0".
- MC TYPE CONDUCTOR WITH INTEGRAL GROUND WIRE MAY BE UTILIZED FOR POWER AND LIGHTING CIRCUITS. MC CABLE SHALL BE UTILIZED ONLY WHERE COMPLETELY CONCEALED.

**LIGHTING NOTES**

- ALL CONDUIT, FIXTURES AND OUTLETS ARE SHOWN DIAGRAMMATICALLY. EXACT LOCATION AND METHOD OF SUPPORT SHALL BE DETERMINED IN THE FIELD, EXCEPT WHERE SPECIFIC DIMENSIONS AND DETAILS ARE SHOWN.
- ALL LIGHTING FIXTURE SPACING DIMENSIONS AND MOUNTING HEIGHTS ARE RECOMMENDED LOCATIONS. SLIGHT VARIATIONS WHERE NECESSARY TO AVOID INTERFERENCE SHALL BE DETERMINED IN THE FIELD.
- MOUNTING HEIGHTS OF ELECTRICAL EQUIPMENT SHALL BE AS FOLLOWS UNLESS OTHERWISE NOTED:  
a.) LIGHT SWITCHES, 4'-0" FROM FLOOR TO CENTERLINE.  
b.) LIGHT FIXTURES - SEE LIGHTING FIXTURE SCHEDULE. MOUNTING HEIGHT OF FIXTURE IS MEASURED TO BOTTOM OF REFLECTOR.
- WHERE REQUIRED, ADDITIONAL SUPPORT STEEL FOR THE LIGHTING INSTALLATION SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR. SEISMIC RESTRAINTS SHALL BE INCLUDED AS PER STATE BUILDING CODE.
- PROVIDE SEPARATE UN-SWITCHED NEUTRAL TO ALL EMERGENCY LIGHT FIXTURES CONTAINING EMERGENCY BALLASTS.

**ABBREVIATIONS**

A/AMP	AMPERE	IMC	INTERMEDIATE METALLIC CONDUIT
AC	ALTERNATING CURRENT	JB	JUNCTION BOX
AF	AMPERE FRAME	KVA	KILOVOLT-AMPERE
AFF	ABOVE FINISHED FLOOR	KW	KILOWATT
AFC	ABOVE FINISHED GRADE	LTD	LIGHTING
AIC	APPROX INTERRUPTING CAPACITY	PWR	POWER
AL	ALUMINUM	MCB	MAIN CIRCUIT BREAKER
AMTR	AMPERE TRIP	MEC	MASSACHUSETTS ELECTRICAL CODE
ATS	AUTOMATIC TRANSFER SWITCH	MLO	MAIN LUGS ONLY
AWG	AMERICAN WIRE GAUGE	MTE	MOUNTING
C	CONDUIT	MTD	MOUNTED
CKT	CIRCUIT	MCC	MOTOR CONTROL CENTER
CB	CIRCUIT BREAKER	NEC	NATIONAL ELECTRICAL CODE
CU	COPPER	NS	NON-SYSTEM
CL	CENTERLINE	NT	NOT TO SCALE
DC	DIRECT CURRENT	No., #	NUMBER
DE	DUAL ELEMENT	PC	PLUMBING CONTRACTOR
DWG	DRAWING	PM	REVOLUTIONS PER MINUTE
EG	ELECTRICAL CONTRACTOR	RMS	ROOT MEAN SQUARE VALUE
EMW	ELECTRICAL MANHOLE	RSC	RIGID STEEL CONDUIT
EW	ELECTRIC WATER COOLER	SF	SQUARE FOOT
EMT	ELECTRIC METALLIC CONDUIT	SN	SOLID NEUTRAL
FLMT	FLEXIBLE LIQUID TIGHT METALLIC TUBING	ST	SHUNT TRIP CIRCUIT BREAKER
GC	GENERAL CONTRACTOR	TIP	TYPICAL
GRD	GROUND	V	VOLTS
GF	GROUND FAULT CIRCUIT BREAKER	VA	VOLT-AMPERE
GFI	GROUND FAULT INTERRUPTING	VFD	VARIABLE FREQUENCY DRIVE
HVAC	HEATING, VENTILATION AND AIR CONDITIONING	WP	WEATHERPROOF
HP	HORSEPOWER		

**BRANCH CIRCUIT AND FEEDER SYMBOLS**

	BRANCH CIRCUIT OR FEEDER CONCEALED UNLESS OTHERWISE NOTED. BRANCH CIRCUIT DIAGONAL LINES INDICATE NUMBER OR CONDUCTORS, NO DIAGONAL LINES INDICATES TWO (2) CONDUCTORS (1 PHASE AND 1 NEUTRAL). GROUND WIRE(S) NOT INDICATED. MINIMUM SIZE CONDUCTOR #12 AWG AND 3/4" CONDUIT, UNLESS OTHERWISE NOTED
	INDICATES (3) #1 AWG(PHASE), (1) #1 AWG(NEUTRAL), (1) #6 GROUND IN A 1-1/2" CONDUIT
	FLEXIBLE CONNECTION TO MOTOR OR EQUIPMENT
	HOMERUN TO PANELBOARD "P1" CIRCUIT NUMBER 1. DIAGONAL LINES INDICATE (1) PHASE AND (1) NEUTRAL CONDUCTOR. (1) GROUNDING CONDUCTOR UNDERSTOOD.
	HOMERUN TO PANELBOARD "P1" CIRCUIT NUMBER 1 & 3. DIAGONAL LINES INDICATE (2) PHASE AND (2) NEUTRAL CONDUCTOR. (2) GROUNDING CONDUCTOR UNDERSTOOD.
	HOMERUN TO PANELBOARD "P1" CIRCUIT NUMBER 1, 3 & 5. DIAGONAL LINES INDICATE (3) PHASE AND (3) NEUTRAL CONDUCTOR. (3) GROUNDING CONDUCTOR UNDERSTOOD.
	HOMERUN TO PANELBOARD "P1" CIRCUIT NUMBER 1, 3 & 5. DIAGONAL LINES INDICATE (3) PHASE AND (1) NEUTRAL CONDUCTOR. (1) GROUNDING CONDUCTOR UNDERSTOOD.
	HOMERUN TO PANELBOARD "P1" CIRCUIT NUMBER 1, 3 & 5. DIAGONAL LINES INDICATE (3) PHASE CONDUCTORS. NEUTRAL CONDUCTOR NOT REQUIRED. (1) GROUNDING CONDUCTOR UNDERSTOOD.

**SWITCHING SYMBOLS**

	SINGLE POLE SWITCH, RATED 20A, 120/277V, MOUNTING HEIGHT 48" TO CENTERLINE OF TOGGLE SWITCH IN "ON" POSITION, "o" DENOTES FIXTURE SWITCH CONTROL
	THREE WAY SWITCH, RATED 20A, 120/277V, MOUNTING HEIGHT 48" TO CENTERLINE OF TOGGLE SWITCH IN "ON" POSITION, "o" DENOTES FIXTURE SWITCH CONTROL

**LIGHTING FIXTURE SYMBOLS**

	LED LIGHTING FIXTURE, CEILING/SURFACE/RECESSED/PENDANT OR WALL MOUNTED. "A" DENOTES LIGHTING FIXTURE TYPE (SEE FIXTURE SCHEDULE), "2" DENOTES CIRCUIT NUMBER, "o" DENOTES SWITCH CONTROL
	EMERGENCY BATTERY UNIT WITH TWO (2) HEADS
	EXIT SIGN, SHADED REGION INDICATES FACE

**EXISTING EQUIPMENT DESIGNATIONS**

X	EXISTING TO BE REMOVED. REMOVE ALL ASSOCIATED CONDUIT AND CONDUCTORS.
XM	EXISTING TO REMAIN.
XN	EXISTING EQUIPMENT TO BE REPLACED WITH NEW. CONNECT NEW EQUIPMENT TO EXISTING CIRCUIT.
XR	EXISTING EQUIPMENT TO BE RELOCATED. JUNCTION AND EXTEND EXISTING CONDUIT AND CONDUCTORS.
XL	NEW LOCATION FOR EXISTING EQUIPMENT. JUNCTION AND EXTEND CONDUIT AND CONDUCTORS AS REQUIRED.

**RECEPTACLES AND OUTLETS**

	GROUND FAULT INTERRUPTING OUTLET, RATED 20A, 120V RECEPTACLE, MOUNTING HEIGHT 18" TO CENTERLINE AFF BOX AND COVER PLATE
	TELEPHONE/COMPUTER OR DATA OUTLET (R445), FLUSH MOUNTING 18" TO CENTERLINE AFF WITH SINGLE GANG BACK BOX AND COVER PLATE
	INDICATES 4"x4" BOX WITH 1" CONDUIT TO ABOVE HUNG CEILING WITH PULL WIRE

**MOTOR AND CONTROLS**

	MOTOR, NUMERAL INDICATES HORSEPOWER
	DISCONNECT SWITCH, NON-FUSIBLE TYPE, RATED 30A/3P, IN NEMA TYPE "1" ENCLOSURE, UNLESS OTHERWISE NOTED. "3P" DENOTES NEMA TYPE ENCLOSURE
	DISCONNECT SWITCH, FUSED TYPE, RATED 30A, 20A FUSE, 3 POLE IN NEMA TYPE "1" ENCLOSURE, UNLESS OTHERWISE NOTED

**PANELBOARD AND TERMINAL CABINET**

	120/208VOLT LIGHTING OR POWER PANEL, SURFACE MOUNTED
	TRANSFORMER, DRY TYPE

**SITE SYMBOLS**

	UNDERGROUND CONDUIT OR DUCTBANK, REFER TO DRAWING E100
	SECTION "A-A"
	SITE LIGHTING FIXTURE, REFER TO LIGHTING FIXTURE SCHEDULE

**MISCELLANEOUS**

	MECHANICAL EQUIPMENT TAG, REFER TO MECHANICAL SCHEDULE
--	--

PREPARED FOR:

Department of Public Works  
25 Brook Street  
Ayer, MA  
(978) 772-8240

PROJECT TITLE

**Ayer DPW Garage**  
**Grove Pond WTP**  
**Barnum Road**  
**DESIGN DEVELOPMENT**



**BLW Engineers, Inc.**

311 Great Road, Post Office Box 1551  
Littleton, Massachusetts 01460  
T: 978.456.4301 F: 978.428.0067  
www.blwengineers.com

HVAC • ELECTRICAL • PLUMBING • FIRE PROTECTION

PROJECT ARCHITECT:

**WILLIAM SLOAN ASSOCIATES**

551 MAIN STREET WINCHESTER, MA 01890 781-729-2910

STRUCTURAL ENGINEER:

MECHANICAL ENGINEER

ELECTRICAL ENGINEER

Issues / Revisions

No.	Date	Notes

Designed By CMF

Project Manager JCP

Drawn By CMF

Date 05/20/16

Drawing Title

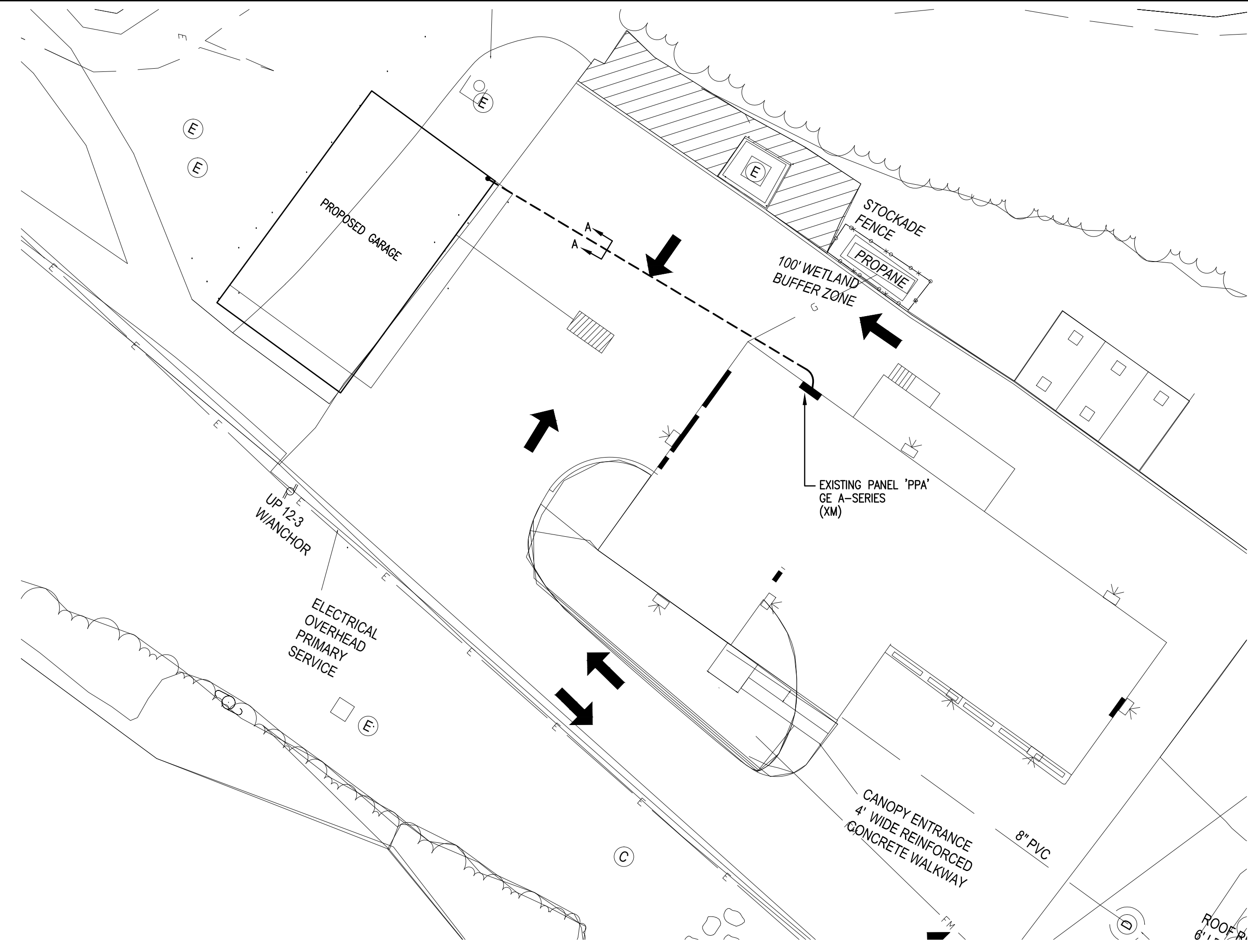
**ELECTRICAL**  
**Legend and**  
**Notes**

Scale As Noted

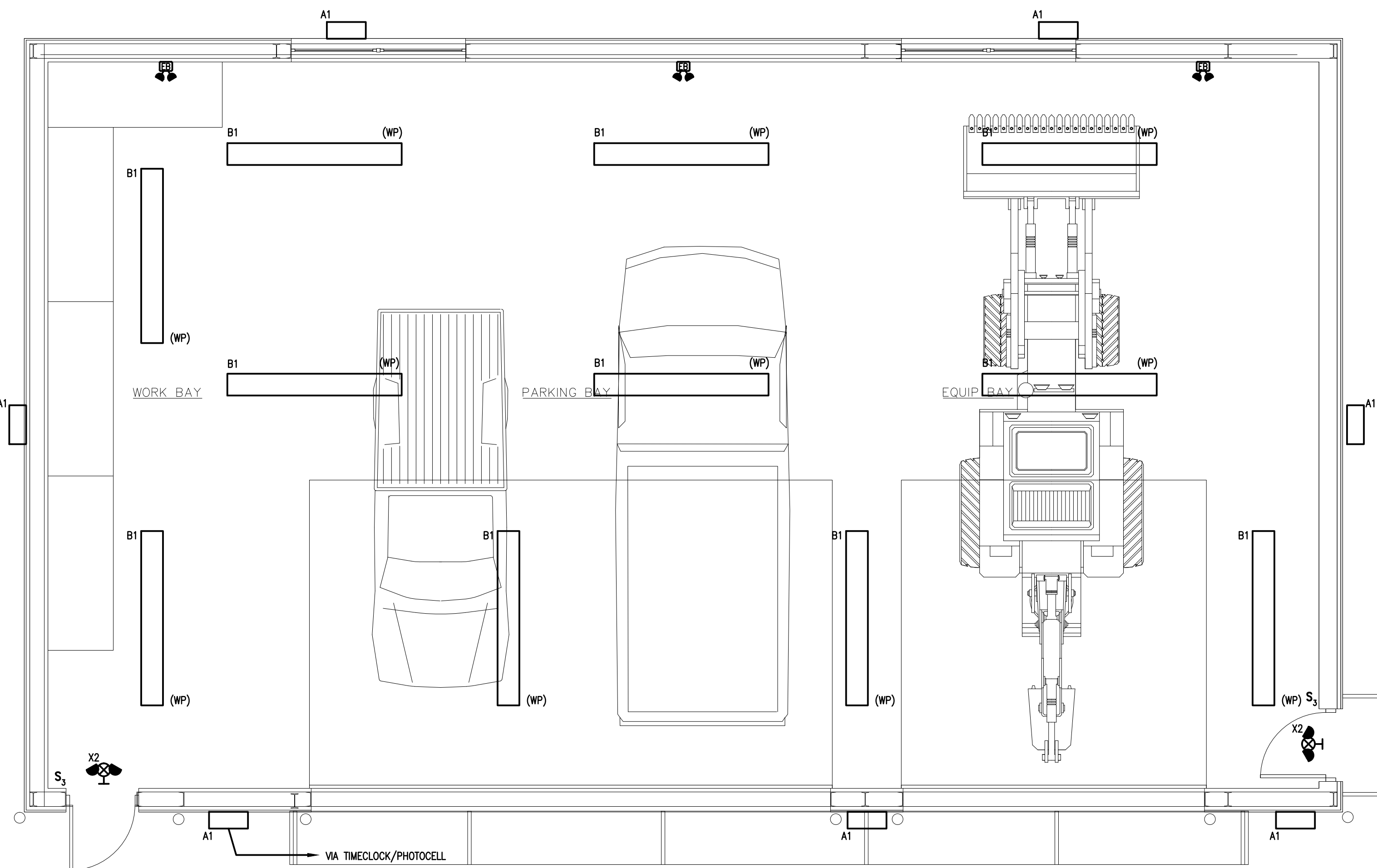
Drawing No.

**E001**

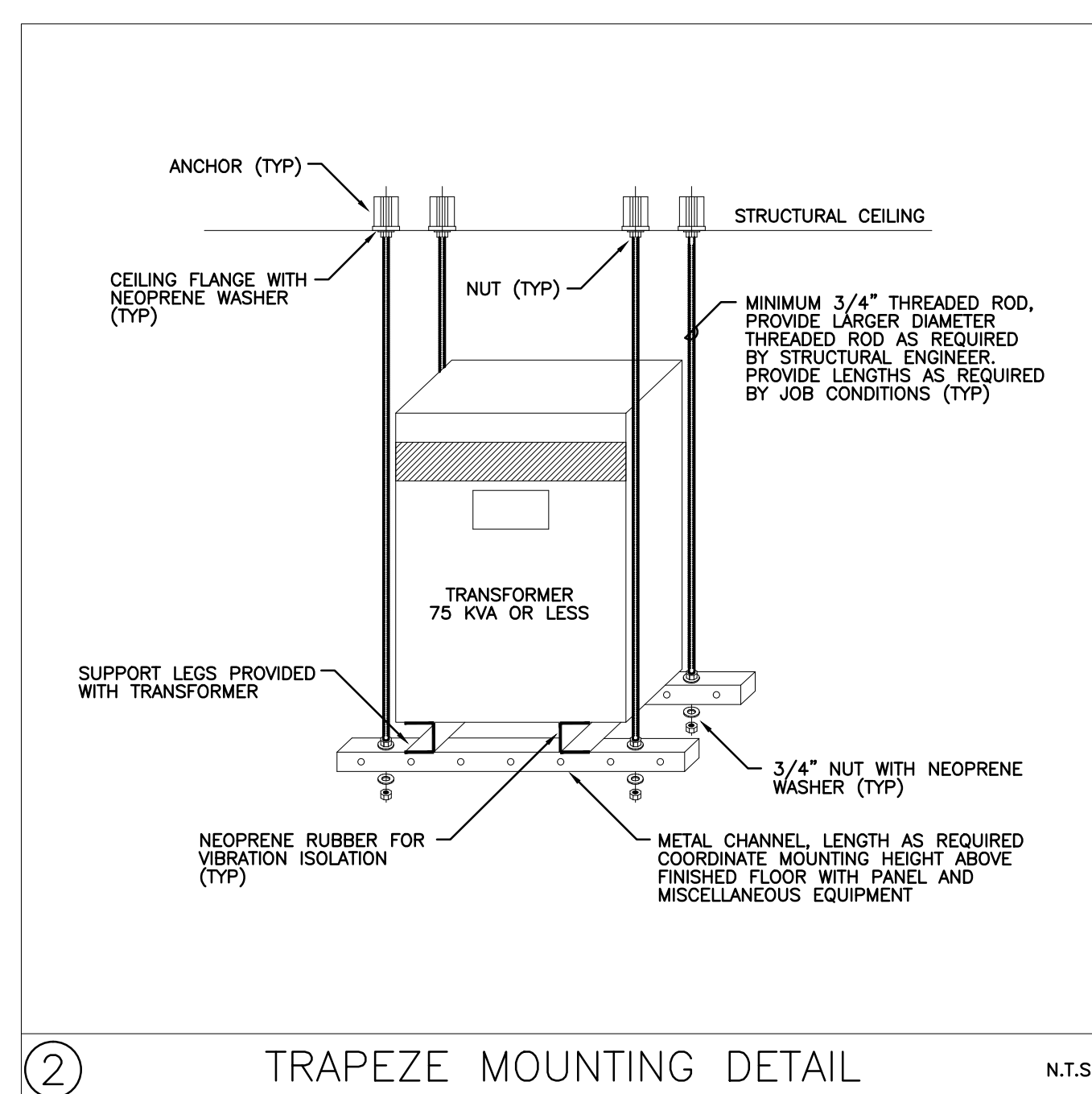
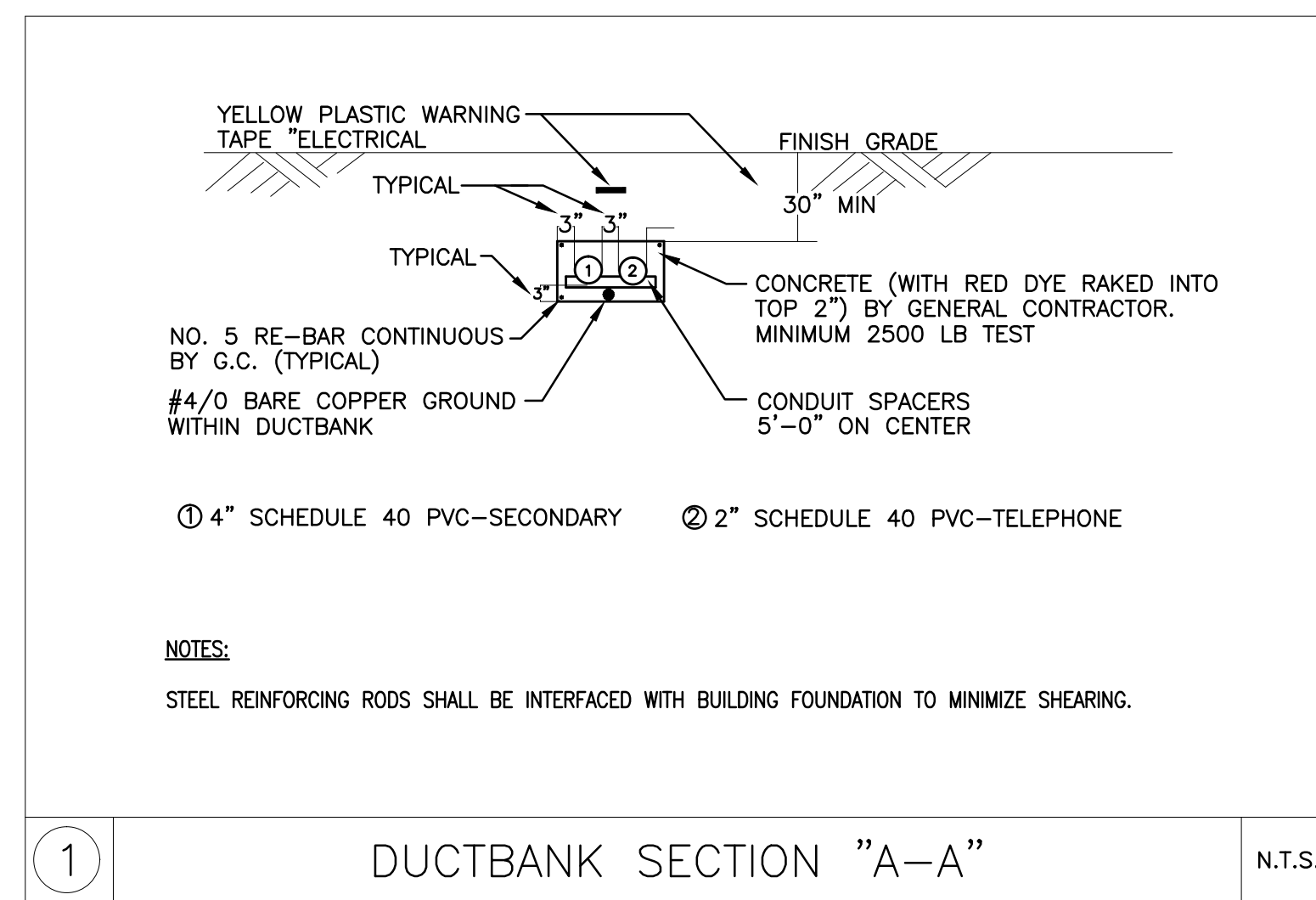
PROGRESS – NOT FOR  
CONSTRUCTION



**3** ELECTRICAL - Site Plan  
 SCALE: 1"= 20'-0"

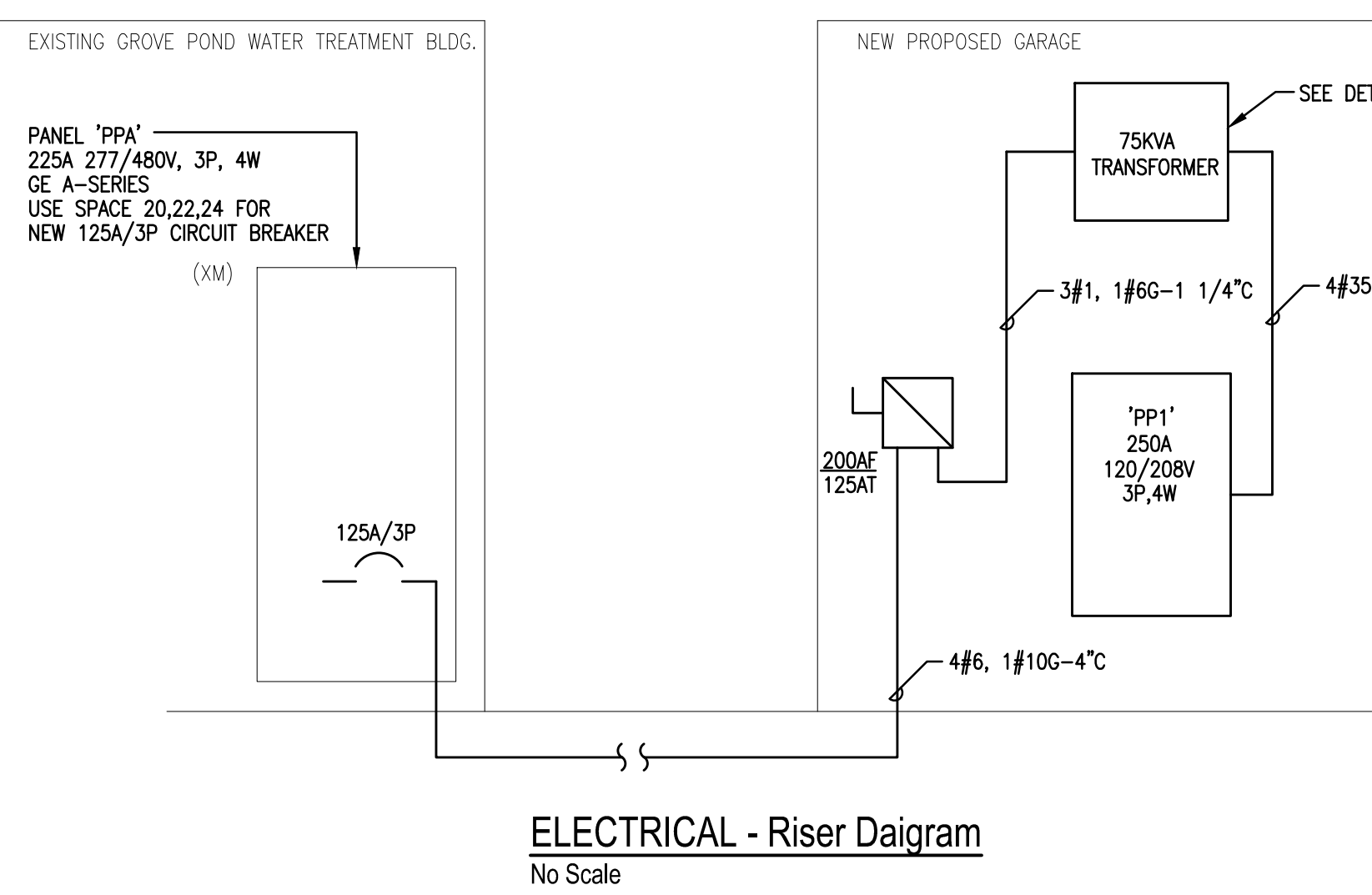


**1** ELECTRICAL - Lighting Plan  
 SCALE: 1/4"= 1'-0"

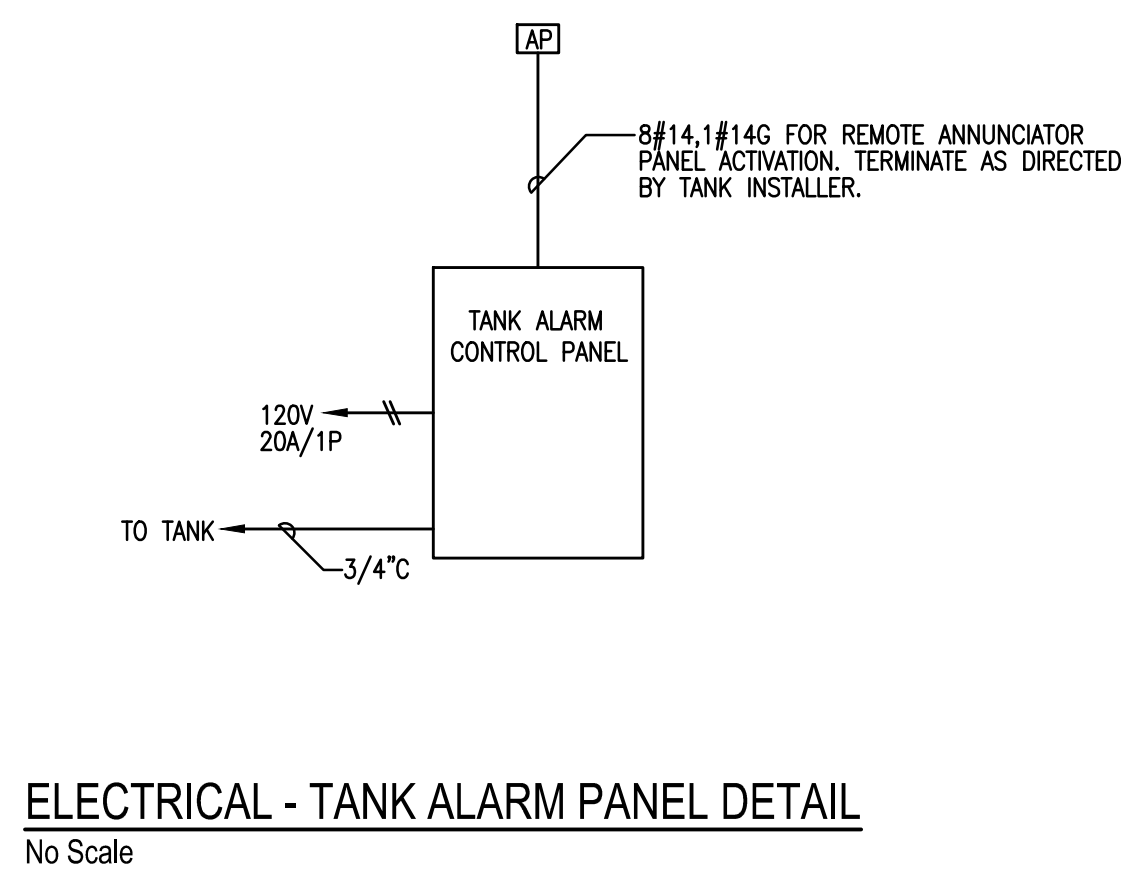


LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE	DESCRIPTION	LAMPS			VOLTAGE
		No.	WATTAGE	TYPE	
A1	EXTERIOR WALL MOUNTED WALL PACK	-	75	LED	120
B1	8' PENDANT MOUNTED LENSED AND GASKETED LED FIXTURE	-	26	LED	120
	EMERGENCY BATTERY UNIT	-	6	LED	120
	EMERGENCY BATTERY UNIT/EXIT SIGN COMBINATION UNIT	-	6	LED	120

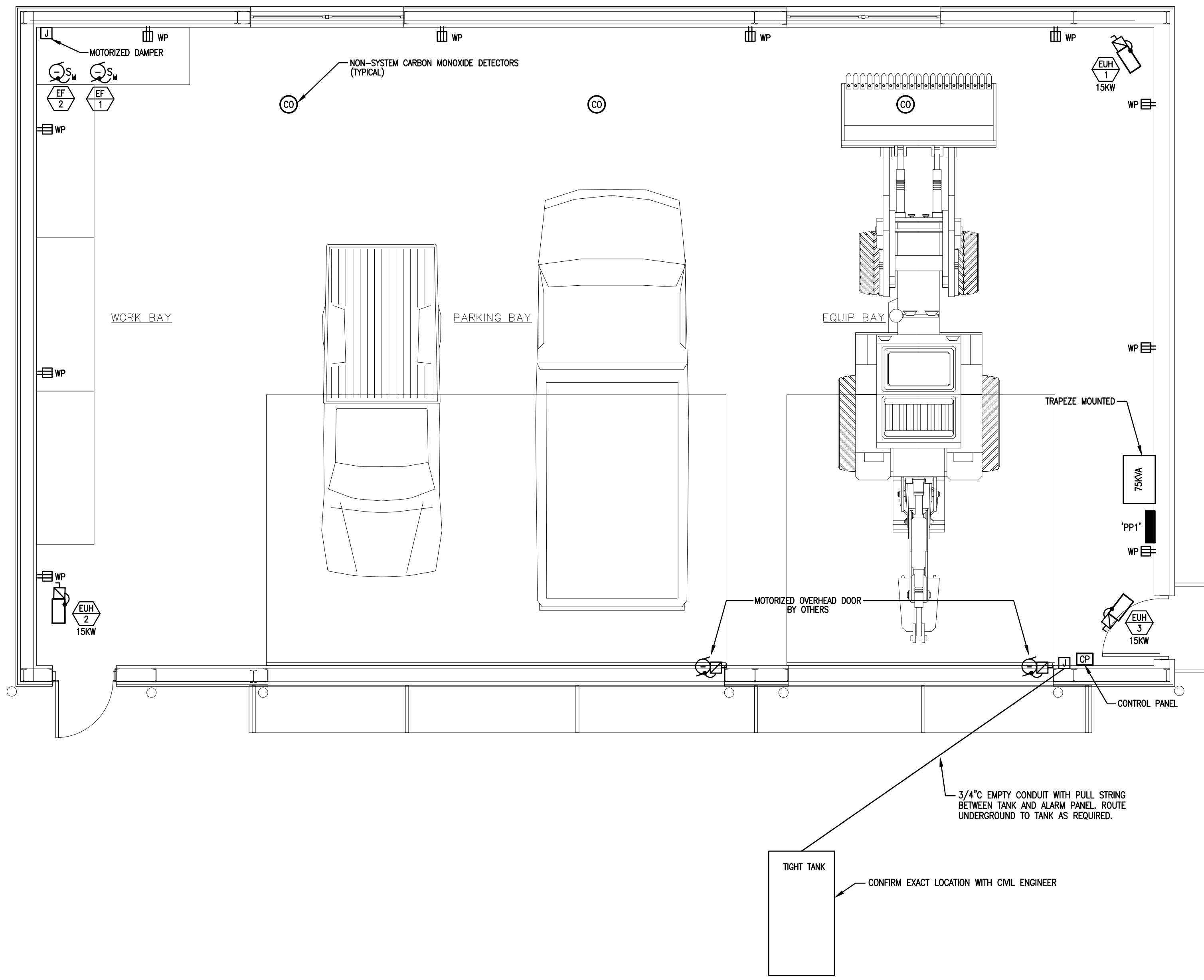


ELECTRICAL - Riser Diagram  
 No Scale



ELECTRICAL - TANK ALARM PANEL DETAIL  
 No Scale

NOTES:  
 1. TANK CONTROL PANEL AND REMOTE ANNUNCIATOR PROVIDED BY TANK INSTALLER.  
 2. EC TO PROVIDE CONDUIT AND WIRING BETWEEN CONTROL PANEL AND REMOTE ANNUNCIATOR.  
 3. CONFIRM ALL WIRING AND CONDUIT REQUIREMENTS WITH TANK INSTALLER PRIOR TO ROUGH-IN.



**2** ELECTRICAL - Power Plan  
 SCALE: 1/4"= 1'-0"

PROGRESS - NOT FOR CONSTRUCTION

Issues / Revisions

No.	Date	Notes

Designed By: CMF  
 Project Manager: JCP  
 Drawn By: CMF  
 Date: 05/20/16  
 Drawing Title:

# Appendix E

## Schematic Specifications

SCHEMATIC SPECIFICATIONS  
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OTHER

HVAC Systems Performance Specifications  
Electrical Systems Performance Specifications

**SECTION 00500**  
**OWNER-CONTRACTOR AGREEMENT**

THIS AGREEMENT is by and between \_\_\_\_\_ The Town of Ayer, Massachusetts \_\_\_\_\_ (“Owner”) and  
\_\_\_\_\_  
\_\_\_\_\_ (“Contractor”).

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

**ARTICLE 1 – WORK**

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is for the Pre-engineered Garage at the Grove Pond Water Treatment Plant and is generally described as follows:

The design, prefabrication, site preparation, site assembly/installation and all services required to complete and deliver one pre-engineered garage at the Grove Pond Water Treatment Plant, ready for use and occupancy.

**ARTICLE 2 – THE PROJECT**

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

See Request for Proposals (RFP) Part 3.

**ARTICLE 3 – ENGINEER**

3.01 The Project has been designed by Ayer DPW (Engineer), who is to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

**ARTICLE 4 – CONTRACT TIMES**

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion and Final Payment*

A. The Work will be substantially completed within 120 days after the date when the Contract Times commence to run as provided in Article VI of the General Conditions, and completed and ready for final payment in accordance with Article VI of the General Conditions within 150 days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$1,000 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner,

Contractor shall pay Owner \$1,000 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

## **ARTICLE 5 – CONTRACT PRICE**

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraph 5.01A.

A. For all Work, at the prices stated in Contractor's Price Proposal Form, attached hereto as an exhibit.

## **ARTICLE 6 – PAYMENT PROCEDURES**

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article VIII of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 30th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Article VIII of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with the General Conditions:
  - a. 95 percent of Work completed (with the balance being retainage); and
  - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 98 percent of the Work completed, less such amounts as Engineer shall determine in accordance with the General Conditions.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with the General Conditions and the Supplementary Conditions, Owner shall pay the remainder of the Contract Price as recommended by the Engineer and as provided in the General Conditions, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

## **ARTICLE 7 – INTEREST**

7.01 Not Applicable

## **ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS**

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities).
- E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.
- F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

**ARTICLE 9 – CONTRACT DOCUMENTS**

9.01 *Contents*

- A. The Contract Documents consist of the following:
  - 1. This Agreement (pages 1 to 5, inclusive).
  - 2. Performance bond and Payment bond
  - 3. General Conditions
  - 4. Supplementary Conditions
  - 5. Specifications as listed in the table of contents of the Project Manual.
  - 6. Drawings consisting of 16 sheets with each sheet bearing the following general title: Pre-Engineered Garage at Grove Pond Water Treatment Plant.
  - 7. Addenda (numbers \_\_\_\_\_ to \_\_\_\_\_, inclusive).
  - 8. Exhibits to this Agreement (enumerated as follows):
    - a. Contractor’s Bid (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).
    - b. Documentation submitted by Contractor prior to Notice of Award (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).
  - 9. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    - a. Notice to Proceed (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

- b. Work Change Directives.
- c. Change Order(s).

10. The Non-Price Proposal and Price Proposal Documents Required by the Request for Proposals (RFP).

- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

**ARTICLE 10 – MISCELLANEOUS**

10.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, Engineer, and Agency. All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf.

This Agreement is dated \_\_\_\_\_.

OWNER:

Board of Selectmen  
Town of Ayer  
Ayer, Massachusetts

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

Title: Chairman

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

Title: Member

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

Title: Member

CONTRACTOR

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Title: \_\_\_\_\_

[CORPORATE SEAL]

[CORPORATE SEAL]

Approved: \_\_\_\_\_

Title: Treasurer

Attest: \_\_\_\_\_

Title: Clerk

Address for giving notices:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Attest: \_\_\_\_\_

Title: \_\_\_\_\_

Address for giving notices:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Agent for service of process:

\_\_\_\_\_

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

**SECTION 00610**  
**PERFORMANCE BOND**

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

---

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER:

Town of Ayer  
1 Main Street  
Ayer, MA 01432

CONTRACT

Date:  
Amount:  
Description (Name and Location):

BOND

Bond Number:  
Date (Not earlier than Contract Date):  
Amount:  
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: \_\_\_\_\_ (Seal)  
Name and Title:

SURETY

\_\_\_\_\_  
Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: \_\_\_\_\_  
Signature and Title

CONTRACTOR AS PRINCIPAL

Company:

Signature: \_\_\_\_\_ (Seal)  
Name and Title:

SURETY

\_\_\_\_\_  
Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

Attest: \_\_\_\_\_  
Signature and Title:

EJCDC No. C-610 (2002 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;
2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone  
Surety Agency or Broker  
Owner's Representative (engineer or other party)



**SECTION 00615**  
**PAYMENT BOND**

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

Town of Ayer  
1 Main Street  
Ayer, MA 01432

CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*):

BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

**CONTRACTOR AS PRINCIPAL**

**SURETY**

\_\_\_\_\_  
Contractor's Name and Corporate Seal (Seal)

\_\_\_\_\_  
Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature (Attach Power of Attorney)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

*Note: Provide execution by additional parties, such as joint venturers, if necessary.*

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. Reserved.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this

Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (Name, Address, and Telephone)

Surety Agency or Broker:

Owner's Representative (Engineer or other):

**SECTION 00810  
NOTICE OF AWARD**

Dated \_\_\_\_\_

Project:	Owner: <b>Town of Ayer</b>	Owner's Contract No.:
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Contract: <b>Pre-Engineered Garage at Grove Pond WTP</b>	Engineer's Project No.:
--	-------------------------

Bidder: \_\_\_\_\_

Bidder's Address: (send Certified Mail, Return Receipt Requested)

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

(Indicate total Work, alternates or sections or Work awarded.)

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 [5] days of the date you receive this Notice of Award.

1. Deliver to the Owner [\_\_\_\_\_] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]
3. Other conditions precedent:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

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

	Owner
By: _____	Authorized Signature
	Title

## SECTION 00811 NOTICE TO PROCEED

Dated \_\_\_\_\_

Project:	Owner: <b>Town of Ayer</b>	Owner's Contract No.:
Contract: <b>Pre-Engineered Garage at Grove Pond WTP</b>	Engineer's Project No.:	

Contractor: \_\_\_\_\_

Contractor's Address: [send Certified Mail, Return Receipt Requested]

\_\_\_\_\_

\_\_\_\_\_

You are notified that the Contract Times under the above contract will commence to run on \_\_\_\_\_. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is \_\_\_\_\_, and the date of readiness for final payment is \_\_\_\_\_ [(or) the number of days to achieve Substantial Completion is \_\_\_\_\_, and the number of days to achieve readiness for final payment is \_\_\_\_\_].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must [add other requirements]:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contractor	Owner
Received by:	Given by:
Title	Authorized Signature
Date	Title
Date	Date

SECTION 01010SUMMARY OF WORKPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Work under this contract is located in the Town of Ayer, Massachusetts, at the Town's Grove Pond Water Treatment Plant (WTP). The Project consists of all services required to complete and deliver the design, prefabrication, site assembly and/or installation of a pre-engineered garage. The work will include excavation for grading and foundation installation, building construction, repaving, and other associated work as shown on drawings and specified herein.
2. The Contractor shall keep the site in an acceptable manner for water department staff to perform routine work and allow for routine facility operation.
3. The Contractor is responsible for all site restoration and final paving.

## B. Restoration of Disturbed Areas

1. The Contractor is responsible for the restoration of all areas disturbed by the work to an equal or better condition than that encountered prior to construction.

1.2 COORDINATION WITH OTHERS

## A. Ayer DPW

1. All materials and other debris removed during demolition shall be removed by the contractor and disposed of in accordance with State Regulations. No material will be stockpiled at the DPW yard with-out permission from the Superintendent.
2. The Contractor shall provide the DPW with a construction schedule indicating the times to perform the work required. The Contractor shall update the schedule when required and give the DPW one week's notice before the start of any work.

1.3 PERMITS

- A. Fees will be waived for any Town permits.

1.4 PROGRESS OF WORK

- A. The Contractor shall promptly start and continue actual construction work under this contract with the necessary crews and equipment to properly execute and complete this contract in the specified time. No cessation of Contractor's operations will be allowed without the approval of the Owner. The rate of progress shall be satisfactory to the Owner.

1.5 VISITS TO THE SITE

- A. Before submitting a bid, the Contractor shall visit the site, examine their conditions and thoroughly acquaint himself with the conditions for performing the work. He shall also study the drawings and compare the same with the information gathered during his examination of the sites, as no extra compensation will be authorized for extra work caused by his unfamiliarity with the sites and/or drawings or the conditions peculiar to this job.

1.6 DISPOSAL OF EXCESS MATERIAL

- A. Any excess soil and removed pavement shall be transported and disposed of at approved locations in accordance to all applicable Laws and Regulations.

1.7 TECHNICAL SPECIFICATIONS

- A. All technical specifications such as ASTM, AWWA, AASHTO, etc, referred to in these specifications refer to the latest revision of such technical specifications.

1.8 SPECIAL CONDITIONS

- A. Prior to commencing excavation work, the Contractor shall notify Dig-Safe (1-800-344-7233) to have all existing public and private utility lines and underground structures marked out.

1.9 EXISTING UTILITIES AND STRUCTURES

- A. The location and size of some existing underground facilities such as sewers, drains, culverts, water mains, gas mains, cables, service pipes, etc., are shown on the plans, based on results of surveys and existing records, and are shown as approximate only. The plans do not show the exact location and depth of all utilities, nor do they show all utilities that may be encountered.
- B. The Contractor shall dig by hand in advance of the trenching machinery to determine the exact location and depth of each utility to be encountered. Excavating machinery shall be stopped at least two feet away from each side of the utility to be crossed and the Contractor shall tunnel by hand under these utilities after he has ascertained their exact location and depth.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 CONSTRUCTION SEQUENCE

- A. The Contractor shall insure that no excavation be left open, unguarded, or water filled during any period of time when work is not actually in progress. It is the purpose and intent that all excavations and backfill, including consolidation operations and temporary surfacing and pavements within an area be accomplished expeditiously before proceeding to other work areas.

- B. The Contractor shall submit to the Engineer for review and acceptance a complete schedule of his proposed sequence of construction operations prior to commencing any work. This schedule shall include the Contractor's plans for doing the work.
- C. The Contractor must submit to the Engineer a written request to deviate from the above sequence, provided he can demonstrate to the Engineer that the continuity will not be adversely affected.

END OF SECTION

SECTION 01110ENVIRONMENTAL PROTECTION PROCEDURESPART 1 - GENERAL1.1 SCOPE OF WORK

- A. Furnish all labor, materials and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.
- B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.
- C. Related Work: Temporary Erosion Control: Section 02270.
- D. This Section is intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.

1.2 APPLICABLE REGULATIONS

- A. Comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.

1.3 NOTIFICATIONS

- A. If the Contractor is notified by the Engineer, State or local agencies in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts corrective action shall be taken. After receipt of such notice from the Engineer or from the regulatory agency, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

1.4 IMPLEMENTATION

- A. Prior to commencement of the work, meet with the Engineer to develop mutual understandings relative to compliance with these provisions and administration of the environmental pollution control program.
- B. Remove temporary environmental control features, when approved by the Engineer and incorporate permanent control features into the project at the earliest practicable time.

PART 2- PRODUCTS (NOT USED)PART 3 - EXECUTION3.1 EROSION CONTROL



- A. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. All erosion control measures shall be in place in an area prior to any construction activity in that area. Specific requirements for erosion and sedimentation controls are specified in Section 02270. Provide any necessary supplemental erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required to prevent silting and muddying of streams.

### 3.2 PROTECTION OF STREAMS AND SURFACE WATERS

- A. Take all precautions to prevent, or reduce to a minimum, any damage to any stream or surface water from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams.
  - 1. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Divert such waters through a settling basin or filter before being directed into streams or surface waters.
  - 2. Do not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.
  - 3. Take all preventative measures to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Massachusetts Department of Environmental Protection. Submit two copies of approved contingency plans to the Engineer.
  - 4. Water being flushed from structures or pipelines after disinfection, with a  $\text{Cl}_2$  residue of 0.15 mg/l or greater, shall be treated with a dechlorination solution, in a method approved by the Engineer, prior to discharge.

### 3.3 PROTECTION OF LAND RESOURCES

- A. Restore land resources within the project boundaries and outside the limits of permanent work to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas approved by the Owner.
- B. Outside of areas requiring earthwork for the construction of the new facilities, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Before beginning operations near them, protect trees that may possibly be defaced, bruised, injured, or otherwise damaged by the construction equipment, dumping or other operations, by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly.
- D. Any trees or other landscape features scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to their original condition. The Engineer will decide the method of restoration to be used and whether damaged trees shall be treated and healed or removed and disposed of.
  - 1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in in diameter shall be coated as soon as possible with an approved tree

- wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.
2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.
- E. The locations of the Contractor's storage and other construction buildings, required temporarily in the performance of the work, shall be cleared portions of the job site or areas approved by the Engineer and shall not be within wetlands or floodplains. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the Engineer.
  - F. Remove all signs of temporary construction facilities such as work areas, structures, stockpiles of excess of waste materials, or any other vestiges of construction as directed by the Engineer.

### 3.4 PROTECTION OF AIR QUALITY

- A. Burning - The use of burning at the project site for the disposal of refuse and debris will not be permitted.
- B. Dust Control - Maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded and which would cause a hazard or nuisance to others. Refer to Section 01562 for additional provisions.
- C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products or chlorides is prohibited.
- D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor shall have sufficient competent equipment on the job to accomplish this. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the Engineer.
- E. Any sweeping operations must include a preliminary sprinkling step to reduce air-borne dust.

### 3.5 NOISE CONTROL

- A. The construction shall not cause noise to increase at the property line, at the nearest residence, by more than 3 decibel above the ambient existing levels. The Contractor shall provide equipment to measure noise levels when requested by Engineer or Owner.
- B. Make every effort to minimize noises caused by the construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations.

### 3.6 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. Maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

END OF SECTION

SECTION 01111CONTROL OF WORK AND MATERIALSPART 1 – GENERAL

Not Used.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

## 3.01 OPEN EXCAVATIONS:

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe means for completely covering all open excavations and for accommodating travel when work is not in progress.
- B. The length of open trench will be controlled by the particular surrounding conditions but shall always be confined to the limits prescribed by the Engineer.
- C. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, then special construction procedures shall be taken, such as limiting the length of trench and prohibiting stocking excavated material in the street.
- D. All street excavations shall be completely closed at the end of each work day. Backfilling or use of steel plates of adequate strength to carry traffic shall be used.

## 3.02 MAINTENANCE OF DPW OPERATIONS DURING CONSTRUCTION:

- A. The Contractor shall maintain safe access through the limit of work as defined in the contract documents. The contractor shall remove snow from the limit of work as needed.
- B. Nothing contained herein shall be construed as relieving the Contractor of any of his responsibilities for protection of persons and property under the terms of the Contract.
- C. The construction activities of the Contractor shall not impede or interfere with the DPW Water Treatment Plant (WTP) facility operations. The Contractor shall communicate with the DPW WTP facility supervisor to make sure that he understands the operations at the facility, and shall submit a plan for approval describing how the work will be performed, in coordination with the Town, to allow the DPW facility to remain fully operational during the project. Portions of the DPW facility and its ancillary structures will only be allowed to be shut-down on a temporary

basis, with prior approval from the Town. The Contractor shall also provide adequate parking on the site for his workers and for the Town. The contractor shall submit a plan, for prior approval, indicating the proposed locations of the staging area. The Contractor shall provide all signs, temporary barricades, and other traffic controls as needed to maintain and control traffic in accordance with local, state and federal regulations.

3.03 CARE AND PROTECTION OF PROPERTY:

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be promptly restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, to the satisfaction of the Engineer. All areas that are disturbed by the Contractor shall be restored back to original conditions.

3.04 MAINTENANCE OF FLOW:

- A. The Contractor shall at his own cost, provide for the flow of sewers and drains interrupted during the progress of the work, and shall immediately cart away and dispose of 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.
- B. All existing drainage facilities including, but not limited to; brooks, streams, canals, channels, ditches, culverts, catch basins and drainage piping shall be adequately safeguarded so as not to impede drainage or to cause siltation of downstream areas in any manner whatsoever. If the Contractor damages or impairs any of the aforesaid drainage facilities, he shall repair the same within the same day.
- C. At the conclusion of the work, the Contractor shall remove all silt in drainage structures caused by his operations as described in Section 01740 - CLEANING UP.

3.05 REJECTED MATERIALS AND DEFECTIVE WORK:

- A. Materials furnished by the Contractor and condemned by the Engineer as unsuitable or not in conformity with the specifications shall forthwith be removed from the work by the Contractor, and shall not be made use of elsewhere in the work.
- B. Any errors, defects or omissions in the execution of the work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good at the expense of the Contractor and in a manner satisfactory to the Engineer.
- C. The Contractor shall reimburse the Owner for any expense, losses or damages incurred in consequence of any defect, error, omission or act of the Contractor or his employees, as determined by the Engineer, occurring previous to the final payment.

### 3.06 SANITARY REGULATIONS:

- A. Sanitary conveniences for the use of all persons employed on the work, properly screened from public observation, shall be provided in sufficient numbers in such manner and at such locations as may be approved. The contents shall be removed and disposed of in a satisfactory manner as the occasion requires. The Contractor shall rigorously prohibit the committing of nuisances within, on or about the work. Any employees found violating these provisions shall be discharged and not again employed on the work without the written consent of the Engineer. The sanitary conveniences specified above shall be the obligation and responsibility of the Contractor.

### 3.07 SAFETY AND HEALTH REGULATIONS:

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Massachusetts Department of Labor and Industries, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction Operations (454 CMR 10.0 et. seq.)." Contractors shall be familiar with the requirements of these regulations.

### 3.08 SITE INVESTIGATION:

- A. The Contractor acknowledges that he has satisfied himself as to the conditions existing at the site of the work, the type of equipment required to perform this work, the quality and quantity of the materials furnished insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the drawings and specifications made a part of this contract. Any failure of the Contractor to acquaint himself with available information will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner.

### 3.09 WEATHER PROTECTION:

- A. In conformance with Sections 44F and 44G of Chapter 149 of the General Laws of Massachusetts, the General Contractor shall install weather protection and shall furnish adequate heat in the area so protected during the months of November through March. Standards for such specifications shall be established by the Director of Building Construction in the Executive Office for Administration and Finance.

### 3.10 ELECTRIC AND WATER SERVICE:

- A. The Contractor shall make all necessary applications and arrangements and pay for all fees and charges for electrical energy for power and light necessary, along with water service/needs, for the proper completion of this contract during its entire progress. The Contractor shall provide and pay for all temporary wiring, switches, lights, receptacles, connections, and meters, and water service. The Contractor shall coordinate with the Town on obtaining water service.

CONTROL OF WORK AND MATERIALS

- B. There shall be sufficient electric lighting so that all work may be done in a workmanlike manner where there is not sufficient daylight.

END OF SECTION

SECTION 01140SPECIAL PROVISIONS

PART 1 – GENERAL Not used

PART 2 – PRODUCTS Not used

PART 3 – EXECUTION

3.01 WATER FOR CONSTRUCTION PURPOSES:

- A. In locations where water is in sufficient supply, the Contractor may be allowed to use water without charge for jetting backfill and other construction purposes. The express approval of the Owner shall be obtained before water is used. Waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted use.
- B. If no water is available, the Contractor shall supply water at no additional cost to the Owner.

3.02 DIMENSIONS OF EXISTING STRUCTURES:

- A. Where the dimensions and locations of existing structures are of critical importance in the installation or connections of new work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment that is dependent on the correctness of such information.

3.03 OCCUPYING PRIVATE PROPERTY

- A. The Contractor shall not enter upon nor occupy with men, equipment or materials any property outside of the public highways or Owner's easements, except with the written consent of the property owner or property owner's agent.

3.04 EXISTING UTILITY LOCATIONS – CONTRACTOR'S RESPONSIBILITY:

- A. The location of existing underground services and utilities shown on the drawings is based on available records. It is not warranted that all existing utilities and services are shown, or that shown locations are correct. The Contractor shall be responsible for having the utility companies locate their respective utilities on the ground prior to excavating.
- B. To satisfy the requirements of Massachusetts law, Chapter 82, Section 40, the Contractor shall, at least 72 hours, exclusive of Saturdays, Sundays and holidays, prior to excavation in the proximity of telephone, gas, cable television and electric utilities, notify the utilities concerned by calling "DIG SAFE" at 811 or at telephone number: 1-888-344-7233.
- C. The Contractor shall coordinate all work involving utilities and shall satisfy himself as to the existing conditions of the areas in which he is to perform his work. He shall conduct and arrange his work so as not to impede or interfere with the work of other contractors working in the same or adjacent areas.

3.05 MAINTENANCE OF TRENCH SURFACE:

- A. After backfilling and compacting the trench, the Contractor shall be responsible for keeping the ground surface dry and passable at all times until the surface has been restored to original conditions.

3.06 SERVICES OF MANUFACTURER'S REPRESENTATIVE:

- A. The Contractor shall arrange for a qualified service representative, at a time suitable to the Engineer, from the company manufacturing or supplying certain equipment as indicated on the detailed specifications, to perform the duties described herein.
- B. After installation of the listed equipment has been completed and the equipment is presumably ready for operation, but before others operate it the representative shall inspect, operate, test, and adjust the equipment. The inspection shall include, but shall not be limited to, the following points as applicable:
  - 1. Soundness (without cracks or otherwise damaged parts); completeness in all details, as specified; correctness in setting, alignment, and relative arrangement of various parts; adequacy and correctness of packing, sealing and lubricants.
  - 2. The operation, testing, and adjustment shall be as required to prove that the equipment is left in proper condition for satisfactory operation under the conditions specified. Where called for in the specifications, vibration readings shall be made and the equipment balanced accordingly.
  - 3. On completion of his work, the Contractor shall submit in triplicate to the Engineer the manufacturer's or supplier representative's complete signed report of the results of his inspection, operation, adjustments, and test. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. The report shall also include a certificate that the equipment conforms to the requirements of the contract and is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.
  - 4. After the Engineer has reviewed the reports from the manufacturer's representative, the Contractor shall make arrangements to have the manufacturer's representative present when the field acceptance tests are made.

3.07 COMPLIANCE WITH PERMITS:

The Contractor shall perform all work in conformance with required permits.

3.08 CUTTING, FITTING AND PATCHING:

- A. The Contractor shall do all cutting, fitting, or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other Contractors, as shown upon or reasonably implied by the drawings and the specifications for the completed structure, including all existing work.



- B. The Contractor shall not endanger any work by cutting, digging, or otherwise and shall not cut or alter the work of any other Contractor, save with the consent of the Engineer.
- C. All holes or openings required to be made in new or existing work, particularly at pipe, conduit, or other penetrations not covered by escutcheons or plates shall be neatly patched. All such holes shall be made completely watertight as approved by the Engineer.
- D. Size and locations of holes required in wood or finish materials for piping, wiring, ducts, etc., which have not been located and detailed on the drawings shall be approved by the Engineer prior to layout and cutting thereof. All holes shall be suitably reinforced as required by the Engineer.
- E. Workmanship and materials of patching and repair work shall match the adjacent similar work and shall conform to the applicable sections of the specification. Patches and joints with existing work shall provide, as applicable in each case, visual, structural, and waterproofing continuity.

### 3.09 CONTRACTOR'S REPRESENTATIVE:

- A. The Contractor shall designate a representative who will be available to respond to emergency calls by the Owner at any time day and night and on weekends and holidays should such a situation arise.

### 3.10 HOURS OF CONSTRUCTION ACTIVITY:

- A. The Contractor shall conduct all construction activity between 7:00 a.m. and 5:00 p.m., Monday through Friday. No construction work shall be allowed on Saturdays, Sundays or Holidays without written authorization from the Owner.

### 3.11 MASSACHUSETTS DATA SECURITY REGULATIONS:

- A. The Contractor is required to comply with data security regulations contained in 201 CMR 17.00 that have been established to safeguard personal information of Massachusetts residents contained in paper or electronic records. The Contractor shall not submit to the Engineer or Owner documents in paper or electronic form that contain personal information (person's name combined with one or more of the following – Social Security Number, driver's license number or state-issued identification card number, financial institution account number, or credit or debit card number). Any document submitted to the Engineer that violates this provision shall be returned to the Contractor and the Contractor shall remove personal information from the document prior to resubmitting it to the Engineer. The Contractor shall require each Subcontractor to also comply with the MA data security regulations insofar as they involve submittal of personal information to the Engineer and Owner.

### 3.12 WINTER WORK:

- A. The Contractor will be required to backfill all excavations at the end of each work day, or place Jersey barriers around open excavations.

B. The Owner will provide snow removal services on all public ways leading to this project site. The Owner will not remove snow from the Contractor's work area that the public will not be using for either driving or pedestrian activity.

C. The Contractor will provide snow removal services within his limit of work.

3.13 STAGING, SCAFFOLDING, HOISTING, AND MATERIAL HANDLING

A. Staging, scaffolding, hoisting, and material handling shall be provided by the Contractor or Subcontractor performing the work.

END OF SECTION

SECTION 01200PROJECT SUBMITTALS, MEETINGS AND QUALITY CONTROLPART 1 - GENERAL

## 1.1 DESCRIPTION

- A. Project Meetings: The Engineer will conduct project meetings throughout the construction period to enable orderly review during progress of the work, and to provide for systematic discussion of problems.
- B. Submittals: Submit to the Engineer, Contractor's Construction Schedule, Shop Drawings, Product Data, Operation and Maintenance Manuals, Manufacturers' Certificates, Project Data, and Samples required by the Specification Sections.
- C. Quality Control: Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

## 1.2 PROJECT MEETINGS

- A. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding all items to be added to the agenda.
- B. Minutes: The Engineer will compile minutes of each project meeting and will furnish a copy to the Contractor. The Contractor may make and distribute such other copies as he wishes.

## 1.3 SUBMISSION REQUIREMENTS

- A. Accompany submittals with transmittal letter, containing:
  - 1. Date.
  - 2. Project title and number.
  - 3. Contractor's name and address.
  - 4. The number of each Shop Drawing, Project Data and Sample submitted.
  - 5. Notification of deviations from Contract Documents.
  - 6. Other pertinent data.
- B. A completed Submittal Certification Form shall be attached to each copy of each shop drawing and must include:
  - 1. Identification of deviations from Contract Documents.
  - 2. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.
  - 3. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
  - 4. Name of Manufacturer.
  - 5. Name of Supplier.
  - 6. Where specified, manufacturer's guarantee.
  - 7. Drawing Number and Detail References, as appropriate.
  - 8. Submittals shall not contain items for more than one Specification Section number.
  - 9. Number and Title of appropriate Specification Section, including paragraph number from the Specification Section.
- C. Coordination:
  - 1. Coordinate preparation and processing of submittals with performance of construction activities.

2. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
3. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities requiring sequential activity.
4. Coordinate transmittal of different types of submittals for related elements of work so processing will not be delayed by need to review submittals concurrently for coordination.
5. Engineer reserves right to withhold action on submittal requiring coordination with other submittals until related submittals are received.

D. Processing:

1. Allow sufficient review time so installation will not be delayed as result of time required to process submittals, including time for resubmittals.
2. Allow 2 weeks for initial review.
3. Allow additional time if processing must be delayed to permit coordination with subsequent submittals.
4. Engineer will promptly advise Contractor when submittal being processed must be delayed for coordination.
5. If intermediate submittal is necessary, process same as initial submittal.
6. Allow 2 weeks for reprocessing each submittal.
7. No extension of Contract Time will be authorized because of failure to transmit submittals to Engineer sufficiently in advance of work to permit processing.

E. Unless otherwise specified, submit minimum 6 hard copies of each type of Submittal. Alternatively, submit 1 electronic copy of each submittal.

1.4 RESUBMISSION REQUIREMENTS

- A. Revise initial drawings as required and resubmit as specified for initial submittal.
- B. Indicate on drawings any changes which have been made other than those required by Engineer.

1.5 ENGINEER'S REVIEW

- A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Bar-Chart Type Schedule

1. Prepare fully developed, horizontal bar-chart-type Contractor's Construction Schedule.
2. Submit within 30 days of date established for start of work.
3. Provide separate time bar for each significant construction activity.
4. Provide continuous vertical line to identify first working day of each week.
5. Prepare Schedule on sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for entire construction period.

6. Show each activity in proper sequence.
7. Schedule Updating:
  - a. Revise Schedule after each meeting or activity, where revisions have been recognized or made.
  - b. Issue updated Schedule concurrently with report of each meeting.

#### 1.7 SHOP DRAWINGS

- A. Shop Drawings are required for each and every element of the work. Each shop drawing shall be assigned a sequential number for purposes of easy identification, and shall retain its assigned number, with appropriate subscript, on required resubmissions.
- B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.
- C. The Contractor shall submit to the Engineer a minimum of six (6) copies of Shop Drawings and approved data. The Engineer will retain three (3) copies (for Owner's, Engineer's and Field Representative's files) and return three (3) copies to the Contractor for distribution to subcontractors, suppliers and manufacturers. If the Contractor requires more than three (3) then the number of copies submitted shall be adjusted accordingly. The only exception to the above is that all shop drawings which incorporate blue line type drawings shall be submitted with only one good quality reproducible. The Engineer will return the one marked up reproducible to the Contractor.
- D. The Contractor shall provide a copy of the completed Submittal Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of each shop drawing. Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the work.
- E. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the Engineer's review. Any deviation from this requirement, such as submitting miscellaneous metals grouped by structure, shall be requested in writing prior to any associated submittal.
- F. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.
- G. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. 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.
- H. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.

- I. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. Shop drawings shall be of standardized sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for re submittal without being reviewed.
- J. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.
- K. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in his letter of transmittal.
- L. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, he shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.
- M. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion.
- N. SAMPLES - The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available.

## 1.8 PRODUCT DATA

### A. General:

- 1. Collect product data into single submittal for each element of construction or system.
- 2. Product data includes printed information such as Manufacturer's Installation Instructions, Catalog Cuts, Standard Color Charts, Roughing-In Diagrams and Templates, Standard Wiring Diagrams, and Performance Curves.
- 3. Where product data must be specially prepared because standard printed data is not suitable for use, submit as shop drawings.
- 4. Mark each copy to show applicable choices and options.

5. Where printed product data includes information on several products, some of which are not required, mark copies to indicate applicable information.
6. Include following information:
  - a. Manufacturer's printed recommendations.
  - b. Compliance with recognized Trade Association standards.
  - c. Compliance with recognized Testing Agency standards.
  - d. Application of Testing Agency Labels and Seals.
  - e. Notation of dimensions verified by field measurements.
  - f. Notation of coordination requirements.
7. Do not submit product data until compliance with requirements of Contract Documents has been confirmed.

B. Material Safety Data Sheets (MSDS):

1. Submit three copies of MSDS for all products scheduled or planned for use on Project.
2. Do not purchase any products until MSDS have been submitted to Engineer and reviewed.

C. Preliminary Submittal: Submit preliminary single copy of product data where selection of options is required.

D. Submittals:

1. Submit 4 copies of each required submittal; submit 4 copies of Maintenance Manuals.
2. Engineer will return one marked with action taken and corrections or modifications required.

E. Distribution:

1. Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities; show distribution on Transmittal Forms.
2. Do not proceed with installation until applicable copy of product data applicable is in installer's possession.
3. Do not permit use of unmarked copies of product data in connection with construction.

## 1.9 ENGINEER'S ACTION

A. General:

1. Except for submittals for record, information, or similar purposes, where action and return is required or requested, Architect will review each submittal, mark to indicate action taken, and promptly return.
2. Compliance with specified characteristics is Contractor's responsibility.

## 1.10 QUALITY REQUIREMENTS

A. Quality Assurance

1. Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

- B. Testing by Independent Agency includes but is not limited to:
  - 1. Concrete slump and compression.
  - 2. Structural steel connections, welds.
  - 3. Soil testing and compaction.

## PART 2 - PRODUCTS

(No products are required in this Section.)

## PART 3 - EXECUTION

### 3.1 PROJECT MEETINGS

- A. Except as noted below for pre-construction conference, project meetings will be held monthly. Coordinate as necessary to establish mutually acceptable schedule for meetings.
- B. Meetings will be held at the Ayer DPW office.
- C. **Pre-construction conference** will be scheduled within twenty days after the Effective Date of the Agreement, but before the Contractor starts any work at the site. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance. Minimum agenda:
  - 1. Identification of key project personnel for Owner, Engineer, Contractor, funding/regulatory Agencies.
  - 2. Responsibilities of Owner, Engineer, Resident Project Representative, Contractor.
  - 3. Channels and procedures for communications.
  - 4. Construction schedule, including sequence of critical work.
  - 5. Easements, permits.
  - 6. Contract Documents, including distribution of required copies of original documents and revisions.
  - 7. Processing of Shop Drawings and other data submitted to the Engineer for review.
  - 8. Processing of field decisions and Change Orders.
  - 9. Rules and regulations governing performance of the Work, including funding/regulatory Agency requirements.
  - 10. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

### D. PROGRESS MEETINGS

- 1. Review, revise as necessary, and approved minutes of previous meeting.
- 2. Review progress of the Work since last meeting, including status of submittals for approval.
- 3. Review schedule of work to be accomplished prior to next meeting.
- 4. Discuss monthly partial payment request.
- 5. Review status of change order requests and Work Directive Changes.
- 6. Identify problems which impede planned progress.
- 7. Develop corrective measures and procedures to regain planned schedule.
- 8. Complete other current business.



3.2 QUALITY CONTROL

- A. Employ field and/or technical services of suppliers, manufacturers, or other agencies required to complete the work as necessary and maintain quality control over, suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- C. Perform work by persons qualified to produce workmanship of specified quality.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
- D. Comply with manufacturer's instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Engineer before proceeding. When required by individual Specifications Section, submit manufacturer's certificate that products meet or exceed specified requirements.
- E. When specified in respective Specification Sections, require supplier and/or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.
- F. Representative shall submit written report to Engineer listing observations and recommendations.

3.3 TESTING LABORATORY SERVICES

- A. Contractor will employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services wherever an Independent Testing Laboratory is required by individual specification sections listed in paragraph 1.10 above, or the specific sections, unless otherwise indicated.
- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports will present observations and test results and indicate compliance or non-compliance with specified standards and with Contract Documents. Independent Testing Laboratory will submit one copy of each report directly to each of the following: Owner, Engineer, Resident Project Representative, and Contractor. Reports will be mailed within 5 days of obtaining test results. If test results indicate deficiencies, Independent Testing Laboratory shall telephone or FAX results to Engineer and Contractor within 24 hours.
- D. Contractor shall cooperate with Independent Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.
- E. Contractor shall coordinate all testing work and shall notify Engineer and Independent Testing Laboratory at least 24 hours prior to performing work requiring testing services. If scheduled tests or sampling cannot be performed because the work is not ready as scheduled, testing costs associated with the delay will be determined by Engineer and invoiced to Contractor. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price. If adequate notice is not provided, Contractor shall suspend work on that portion of the Project until testing can be performed. Such suspension will not be grounds for a claim against the Owner for delay, nor will it be an acceptable basis for an extension of time.
- F. Payment for Independent Testing Laboratory services shall be as follows:
  - 1. General: Where testing is the Contractor's responsibility, payment will be made as stated below unless other requirements are given in Specification Sections. Testing

which is the responsibility of the Contractor will be considered an incidental item unless otherwise indicated in Section 01150, Measurement and Payment.

2. Initial Testing: Contractor will pay for initial tests.
3. Retesting: Costs of retesting due to non-compliance will be paid by Contractor. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.
4. Contractor's Convenience Testing: Inspections and tests performed for Contractor's convenience will be paid for by Contractor.

### 3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 1 Section "Execution"
2. Protect construction exposed by or for quality-control service activities.
3. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01420REFERENCESPART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may not be identical with the description of the land on which Project is to be built.

## 1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

AA	Aluminum Association, Inc. (The)
ABAA	Air Barrier Association of America
AF&PA	American Forest & Paper Association
AGC	Associated General Contractors of America (The)
AIA	American Institute of Architects (The)
ALSC	American Lumber Standard Committee, Incorporated
ANSI	American National Standards Institute
APA	APA - The Engineered Wood Association
ARMA	Asphalt Roofing Manufacturers Association
ASTM	ASTM International (American Society for Testing and Materials International)
AWI	Architectural Woodwork Institute
AWPA	American Wood Protection Association (Formerly: American Wood Preservers' Association)
CSI	Construction Specifications Institute (The)
FM Approvals	FM Approvals LLC
FM Global	FM Global (Formerly: FMG – FM Global)
FSC	Forest Stewardship Council
GA	Gypsum Association

HPVA	Hardwood Plywood & Veneer Association
ISO	International Organization for Standardization Available from ANSI
MHIA	Material Handling Industry of America
MPI	Master Painters Institute
NAAMM	National Association of Architectural Metal Manufacturers
NAIMA	North American Insulation Manufacturers Association
NeLMA	Northeastern Lumber Manufacturers' Association
NFPA	National Fire Protection Agency
NLGA	National Lumber Grades Authority
NRCA	National Roofing Contractors Association
PDCA	Painting & Decorating Contractors of America
SPIB	Southern Pine Inspection Bureau
SSPC	The Society for Protective Coatings
SWRI	Sealant, Waterproofing, & Restoration Institute
UL	Underwriters Laboratories Inc.
WCLIB	West Coast Lumber Inspection Bureau
WI	Woodwork Institute (Formerly: WIC – Woodwork Institute of California)
WMMPA	Wood Moulding & Millwork Producers Association
WWPA	Western Wood Products Association

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

ICC	International Code Council
UBC	Uniform Building Code

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names are subject to change and are believed to be accurate and up-to-date as of the date of the

Contract Documents.

CPSC	Consumer Product Safety Commission
DOC	Department of Commerce
DOE	Department of Energy
EPA	Environmental Protection Agency
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety & Health Administration
PBS	Public Buildings Service
PHS	Office of Public Health and Science
SD	State Department

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CFR	Code of Federal Regulations Available from Government Printing Office
FED-STD	Federal Standard (See FS)
FS	Federal Specification Available from Department of Defense Single Stock Point  Available from Defense Standardization Program  Available from General Services Administration  Available from National Institute of Building Sciences
FTMS	Federal Test Method Standard (See FS)

PART 2 -PRODUCTS Not Used

PART 3 -EXECUTION Not Used

END OF SECTION

SECTION 01450STRUCTURAL TESTS AND INSPECTIONSPART 1 -GENERAL

## 1.01 WORK INCLUDED:

- A. Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Obtaining, coordinating, and providing notifications to the Owner and Engineer.
  - 2. Provide safe access to the work of this Contract to accommodate the indicated tests and inspections.
  - 3. Implementing corrective action and providing additional tests and/or inspections for work identified as non-conforming by the Independent Testing Agency.

## 1.02 GENERAL REQUIREMENTS

- A. The Massachusetts State Building Code, Eighth Edition, 780 CMR, requires the Structural Engineer of Record (SER) to provide a program of structural tests and inspections for this project.
- B. The Program of Structural Tests and Inspections shall not relieve the Contractor or its subcontractors of their responsibilities and obligations for quality control of the Work, their other obligations for supervising the Work, for any design work which is included in their scope of services, and for full compliance with the requirements of the Contract Documents. Furthermore, the detection of, or failure to detect, deficiencies or defects, whether detected or undetected, in all parts of the Work, and to otherwise comply with all requirements of the Contract Documents.
- C. The Program of Structural Tests and Inspection does not apply to the Contractor's equipment, temporary structures used by the Contractor to construct the project, the Contractor's means, methods, procedures, and job site safety.

## 1.03 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall provide free and safe access to the Work for the SER and all other individuals who are observing the Work or performing structural tests or inspections. The Contractor shall provide all ladders, scaffolding, staging, and up-to-date safety equipment, all in good and safe working order, and qualified personnel to handle and erect them, as may be required for safe access.

## STRUCTURAL TESTS AND INSPECTIONS

B. The Contractor shall give reasonable notice to the Owner and the Engineer of when the various parts of the Work will be ready for testing and/or inspection. The Contractor shall notify the Owner and the Engineer a minimum of 48 hours before such tests and/or inspections are to take place.

PART 2 -PRODUCTS

NOT USED.

PART 3 -EXECUTION

NOT USED.

END OF SECTION





## **Section 01500**

### **COMMONWEALTH OF MASSACHUSETTS STANDARD VERTICAL CONSTRUCTION CONTRACT For Projects over \$100,000 Subject to M.G.L. c. 149, s. 44A-F**

## **GENERAL CONDITIONS OF THE CONTRACT**

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## ARTICLE I: DEFINITION OF TERMS

The following words shall have the following meanings as used in this Contract:

**Advertisement:** The Advertisement or Notice Inviting Bids or Proposals for the Work.

**Approval:** (or Approved): An approval in writing signed by the authorized signatory of the Awarding Authority.

**Architect:** The architect identified as the Designer in Article 3 of the *Owner - Contractor Agreement*.

**As directed (As permitted, as required, as determined or words of like effect):** The direction, permission, requirement or determination of the Designer or the Awarding Authority. Similarly, *approved, acceptable, satisfactory* or words of like import shall mean approved by or acceptable or satisfactory to the Designer, except as may be otherwise determined by the Awarding Authority.

**Awarding Authority:** The public agency awarding and administering this Contract identified as the Awarding Authority in the *Owner - Contractor Agreement*. Where the Awarding Authority is an agency of the Commonwealth, references to the Awarding Authority shall also include the Commonwealth and its agencies.

**Building Code:** All applicable rules and regulations to which the Awarding Authority is subject and which are contained or referenced in the code authorized by M.G.L. c. 143, s. 93 et seq., including all amendments thereto.

**Certificate of Agency Use and Occupancy:** A certificate signed by the Designer and the Awarding Authority pursuant to the requirements of Article VI of these General Conditions of the Contract, indicating that the Awarding Authority has determined that (1) the Work has been completed in accordance with the Contract Documents, except for Punch List items, (2) certificates of inspection, testing and/or approval (including a certificate of occupancy under the Building Code), operating permits for any mechanical apparatus which may be required to permit full use and occupancy of the Work by its intended users (which in a Subcontractor's case may include the Contractor) have been delivered to the Awarding Authority, (3) any applicable written warranties, operating instructions and related materials have been delivered to the Awarding Authority, and (4) the Work may be used for its intended purpose without substantial inconvenience or interference.

**Change Order:** (1) A written order not requiring the consent of the Contractor, signed by the Project Manager and designated as a Change Order, directing the Contractor to make changes in the Work within the general scope of the Contract, or (2) any written or oral order from the Project Manager that causes any change in the Work, provided that the Contractor has given the Awarding Authority written notice stating the date, circumstances, and source of the order and that the Contractor regards the order as a Change Order.

**Contract:** The Contract formed by the Contract Documents as defined in Article 9 of the *Owner - Contractor Agreement*.

**Contract Documents:** The documents listed in Article 9 of the *Owner - Contractor Agreement*.

**Contract Modification:** Any alteration of the Contract Documents accomplished by a written agreement properly executed by the parties to this Contract.

**Contract Price:** The Contract Price stated in Article 5 of the *Owner - Contractor Agreement* which is the total sum owed to the Contractor for all of the Work.

**DCAMM or DCAM:** The Division of Capital Asset Management and Maintenance of the Commonwealth of Massachusetts.

**Designer:** The architect or engineer identified as the Designer in Article 3 of the *Owner - Contractor Agreement*, subject to the provisions of Article III, Section 1 of these General Conditions of the Contract.

**Dispute Review Board:** A panel of three experienced impartial reviewers organized and agreed upon by the Owner and Contractor. The Board members are provided with plans and specifications, become familiar with project procedures and participants,

meet on the job site regularly to encourage the resolution of disputes at the job level and renders non-binding recommendations on the resolution of the dispute.

**Engineer:** The Designer, except that the term "Resident Engineer" shall have the meaning otherwise specified herein.

**Drawings:** The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including Plans, elevations, sections, details, schedules, and diagrams.

**Final Acceptance:** The written determination by the Designer and by the Awarding Authority that the Work has been 100% completed, except for the Contractor's indemnification obligations, warranty obligations, obligations to continue to maintain insurance coverage for the time periods provided in the Contract Documents, and any other obligations which are intended to survive Final Acceptance and/or the termination of the Contract.

**General Bid:** The completed bid form submitted by the Contractor in accordance with the requirements of M.G.L. c. 149.

**Laws:** All applicable statutes, regulations, ordinances, codes, laws, orders, decrees, approvals, certificates and requirements of governmental and quasi-governmental authorities.

**Neutral:** An impartial third party not having an interest in the Owner, the Designer, the Contractor or the Project.

**Notice to Proceed:** The written notice provided by the Awarding Authority to the Contractor which authorizes the Contractor to commence the Work as of a date specified therein, from which date the time of completion specified in Article 4 of the Owner - Contractor Agreement is measured.

**Or equal (or words of like import):** Equal in the opinion of the Awarding Authority determined pursuant to the provisions of M.G.L. c.30, s. 39M and the provisions of these General Conditions of the Contract.

**Owner:** The Town of Ayer or political subdivision thereof, authority, or other instrumentality that will own the Work.

**Plan(s):** Drawing(s).

**Product Data:** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor or its Subcontractors and suppliers to illustrate materials or equipment for some portion of the Work. Product data also include any such information or instructions produced by the manufacturer or distributor of such materials or equipment and made readily available by said manufacturer or distributor.

**Progress Schedule:** The progress schedule Approved by the Designer and the Awarding Authority in accordance with Article VI of these General Conditions of the Contract.

**Project:** The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

**Project Manager:** The Awarding Authority's representative assigned to the Project.

**Punch List:** A list of items determined by the Awarding Authority to be minor incomplete or unsatisfactory work items that do not materially impair the usefulness of the Work for its intended purpose.

**Resident Engineer:** The on-Site representative of the Awarding Authority.

**Samples:** Samples are physical examples, that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.

**Schedule of Values:** The schedule Approved by the Awarding Authority pursuant to Article VIII of these General Conditions of the Contract which allocates the Contract Price to the various portions of the Work and is used as a basis for payments to the Contractor.

**Shop Drawings:** Drawings, diagrams, details, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate a portion of the Work.

**Site:** The land and, if any, building(s) or space within any such building(s) on which or in which the Contractor is to perform the Work.

**Specifications:** The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, and workmanship for the Work and performance of related services.

**Subcontractor:** Person or entity with whom the Contractor contracts in order to perform the Work, except as otherwise specifically provided or required herein or by Law. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization, (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom OWNER may have reasonable objection. Acceptance of any Subcontractor, other person or organization by OWNER shall not constitute a waiver of any right of OWNER to reject defective Work. CONTRACTOR shall not be required to employ any Subcontractor, other person or organization against whom CONTRACTOR has reasonable objection.

**Substantial Completion:** For work subject to M.G.L. c. 30 s. 39K, "substantial completion" shall occur when (1) the Contractor fully completes the Work or substantially completes the Work so that the value of the Work remaining to be done is, in the estimate of the Awarding Authority, less than one percent of the original contract price, or (2) the Contractor substantially completes the work and the Awarding Authority takes possession for occupancy, whichever occurs first. For work subject to M.G.L. c. 30 s. 39G "substantial completion" shall mean either that the work required by the Contract has been fully completed, completed except for work having a Contract Price of less than one percent of the then adjusted total Contract Price, or substantially all of the Work has been completed and opened to public use except for minor incomplete or unsatisfactory work items that do not materially impair the usefulness of the Work.

**Superintendent:** The licensed construction supervisor who is an employee of the Contractor designated to be in full-time attendance at the Site throughout the prosecution and progress of the Work and who shall have complete authority to act for the Contractor.

**User Agency:** The department, county, commission, board, agency or other instrumentality of the Town of Ayer or political subdivision thereof which operates or which will operate the facility at which the Work is undertaken or which comprises the completed Work.

**Work:** The Work defined in Article 1 of the Owner - Contractor Agreement, Article II, Section 2 of these General Conditions of the Contract and otherwise in the Contract Documents.

**Working Hours:** 7:30 a.m. to 5:00 p.m., but not more than eight hours per day, Monday through Friday, excluding holidays, unless otherwise specified by applicable Laws. Requests to work other than regular working hours shall be submitted to ENGINEER not less than 48 hours prior to any proposed weekend work or scheduled extended work weeks. Occasional unscheduled overtime on weekdays may be permitted provided two hours' notice is given to ENGINEER. CONTRACTOR shall reimburse the OWNER for additional engineering and/or inspection costs incurred as a result of overtime work in excess of the regular working. The CONTRACTOR shall keep the site in an acceptable manner for Water Department Staff to perform routine work at all times.

All terms that this Contract defines may be used with or without initial capital letters. Other terms, abbreviations and references are defined as they appear herein. Words and abbreviations that are not defined in the Contract Documents but which have recognized technical or trade meanings are used in accordance with those meanings. For additional definitions of terms, abbreviations and references refer to the *Supplementary General Conditions, or Specifications.*

## **ARTICLE II: EXECUTION OF THE CONTRACT, SCOPE OF WORK, INTERPRETATION OF CONTRACT DOCUMENTS**

**1. Execution.**

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

**2. Scope of Work.**

The Work consists of the Work identified in the Contract Documents. The Work comprises the completed construction required by the Contract Documents and includes all labor, tools, materials, supplies, equipment, permits, approvals, paperwork, calculations, submittals, and certificates necessary to develop, construct and complete the Work in accordance with all Laws, and all construction and other services required to be supervised, overseen, performed or furnished by Contractor or that the Contract Documents require the Contractor to cause to be supervised, overseen, performed or furnished. The Contractor shall provide and perform for the Contract Price all of the duties and obligations set forth in the Contract Documents.

**3. Interpretation.**

A. The Plans and Specifications and other Contract Documents are to be considered together and are intended to be mutually complementary, so that any work shown on the Plans though not specified in the Specifications, and any work specified in the Specifications though not shown on the Plans, is to be executed by the Contractor as a part of this Contract.

B. All things that in the opinion of the Designer may be reasonably inferred from the Plans, Specifications and other Contract Documents are to be executed by the Contractor. The Designer shall determine whether the detail Plans conform to the general Plans and Contract Documents, except as may be otherwise determined by the Awarding Authority.

C. The tables of contents, titles, headings and marginal notes or sub-scripts contained herein are solely to facilitate references, are not intended to be construed as provisions of the Contract, and in no way affect the interpretation of the provisions to which they refer.

D. Where reference is made in the Contract Documents to publications, standards, or codes issued by associations or societies, such reference shall be interpreted to mean the current edition of such publications, standards, or codes, including revisions in effect on the date of the Advertisement, notwithstanding any reference to a particular date. The foregoing sentence shall not apply to the dates, if any, specified with respect to insurance policy endorsement forms.

E. In case of any conflict among the Contract Documents, unless the context clearly otherwise requires, the Contract Documents shall be construed according to the following priorities:

- First Priority: Contract Modifications
- Second Priority: Owner - Contractor Agreement
- Third Priority: General Conditions of the Contract
- Fourth Priority: Drawings -- Schedules take precedence over enlarged detail Drawings, and enlarged Detail Drawings take precedence over reduced scale Drawings; figured dimensions shall prevail over scale.
- Fifth Priority: Specifications

**4. Distribution of Work.**

The distribution of the Work is intended to be described under the appropriate trades and, except for filed sub-bid work, may be redistributed, except as directed herein, provided that such redistribution shall cause no controversy among the trades and no delay in the progress of the Work.

**5. Contract Price.**



The Contract Price constitutes full compensation to the Contractor for everything to be performed and furnished in connection with the Work and for all damages arising out of the performance of the Work and/or the action of the elements, and constitutes the maximum compensation regardless of any difficulty incurred by the Contractor in connection with the Work or in consequence of any suspension or discontinuance of the Work.

### **ARTICLE III: CONTROL OF WORK / ADMINISTRATION OF THE CONTRACT**

#### **1. Designer.**

Notwithstanding anything to the contrary expressed or implied in this Contract, any of the powers, rights, and duties of the Designer may be exercised by the Awarding Authority, provided that the Awarding Authority shall be under no obligation to do so. The Awarding Authority may rely on the Designer for the performance and exercise of its rights and obligations hereunder and shall be presumed to so rely on the Designer in the absence of an explicit written assumption by the Awarding Authority of any such rights and obligations, except that any Approval required to be obtained from the Awarding Authority hereunder shall not be valid without the signature of the Awarding Authority. The Awarding Authority may explicitly overrule in writing any action, determination or decision of the Designer should the Awarding Authority choose to do so, except to the extent that the same would violate applicable law. Subject to the foregoing, the Designer shall be responsible for the general administration of the Contract and shall perform the duties and exercise the rights herein conferred on the Designer. Except as otherwise specifically provided herein, the Designer shall decide all questions which may arise as to the conduct, quantity, quality, equality, acceptability, fitness, and rate of progress of the several kinds of work and materials to be performed and furnished under this Contract, and shall decide all questions which may arise as to the interpretation of the Plans and Specifications and as to the fulfillment of this Contract on the part of the Contractor. In the case of the death, resignation, inability or refusal of the Designer to act, or the termination of his or her or its employment, the Awarding Authority may appoint another person to act as Designer for the purposes of this Contract. The Awarding Authority shall give written notice to the Contractor of any such appointment.

#### **2. Right of Access to Work.**

The Awarding Authority, the User Agency and the Designer (and persons designated by them) may for any purpose enter upon the Work, the Site, and premises used by the Contractor, and the Contractor shall provide safe facilities therefor. Other contractors of the Awarding Authority may also enter upon the same for the purposes which may be required by their contracts or work. Any differences or conflicts which may arise between the Contractor and other contractors of the Awarding Authority with respect to their work shall be initially resolved by the Designer.

#### **3. Inspection No Waiver.**

No inspection by the Awarding Authority or the Designer or employees or agents of either of them, and no order, measurement, certificate, approval, payment order, payment, acceptance or any other action or inaction of any of them, shall operate as a waiver by the Awarding Authority of any provision of this Contract.

### **ARTICLE IV: GENERAL PERFORMANCE OBLIGATIONS OF THE CONTRACTOR**

The Contractor shall complete for the Contract Price all of the Work in a proper, thorough, and workmanlike manner in accordance with the Contract Documents. Without limiting the foregoing and without limiting the Contractor's obligations under

any other provision of the Contract Documents, the Contractor shall for the Contract Price perform the following general obligations:

**1. Review of Contract Documents and Field Conditions.**

**A.** Before commencing the Work, the Contractor shall carefully study the Contract Documents and carefully compare all Specifications, Plans, Drawings, figures, dimensions, lines, marks, scales, directions of the Designer, and any other information provided by the Awarding Authority and shall at once report to the Designer any questions, errors, inconsistencies, or omissions.

**B.** Before commencing the Work, the Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents and shall at once report to the Designer any questions, errors, inconsistencies, or omissions.

**2. Supervision and Construction Procedures; Coordination; Cutting, and Patching.**

**A.** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and shall have control over, construction means, methods, techniques, sequences and procedures, and shall be responsible for coordinating all portions of the Work under the Contract.

**B.** The Contractor shall be responsible for the proper fitting of all Work and the coordination of the operations of all trades, Subcontractors, and materialmen engaged upon the Work. The Contractor shall guarantee to each of its Subcontractors all dimensions which they may require for the fitting of their work to all surrounding work.

**C.** All necessary cutting, coring, drilling, grouting, and patching required to fit together the several parts of the Work shall be done by the Contractor, except as may be specifically noted otherwise under any particular filed sub-bid section of the Specifications.

**D.** The Contractor shall be responsible to the Awarding Authority for the acts and omissions of the Contractor's employees, agents and Subcontractors, and their agents and respective contractors employees, and other persons performing portions of the Work or supplying materials therefor.

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

**F.** The Contractor shall employ a registered land surveyor to perform any engineering required for establishing grades, lines, levels, dimensions, layouts, and reference points for the trades. The Contractor shall be responsible for maintaining benchmarks and other survey marks and shall replace any benchmarks or survey marks that may have become disturbed or destroyed. The Contractor shall verify the materials shown on the Drawings before laying out the Work and shall be responsible for any error resulting from its failure to exercise this precaution.

**G.** Unless otherwise required by the Supplementary General Conditions or the Plans and Specifications, or directed in writing by the Designer, Work shall be performed during regular Working Hours. However, if the Contractor desires to carry on the Work outside of regular Working Hours or on Saturdays, Sundays, or Massachusetts or federal holidays then the Contractor shall allow ample time to allow satisfactory arrangements to be made for inspecting Work in progress and shall bear the costs of such inspection. The Awarding Authority shall bill the Contractor directly for such costs.

**H.** Work performed outside of regular Working Hours without the consent or knowledge of the Designer and/or the Awarding Authority shall be subject to additional inspection and testing as directed by the Designer. The cost of this inspection and testing shall be borne by the Contractor whether the Work is found to be acceptable or not. The Awarding Authority at its election shall be entitled either to issue a credit Change Order to cover such cost or to withhold such cost from any further payments due the Contractor and/or to receive a payment from the Contractor of the amount of such cost.

### **3. Superintendent.**

**A.** The Contractor shall employ a Superintendent whose appointment shall be subject to the Approval of the Awarding Authority. The Superintendent shall be in attendance at the Site full-time during the performance of the Work. The Superintendent shall represent the Contractor. Communications given to and from the Superintendent shall be deemed given to and from the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed upon written request in each case. The Superintendent shall attend each job meeting. The Superintendent shall be responsible for coordinating all of the Work of the Contractor and the Subcontractors.

**B.** The Superintendent shall be a competent employee regularly employed by the Contractor. The Superintendent shall be licensed in accordance with the Building Code and shall have satisfactorily performed similar duties on previous construction projects similar in type, complexity and scale to the Project. The Superintendent's resume shall be submitted to the Awarding Authority prior to commencement of construction together with such other information as the Awarding Authority may reasonably require in order to determine whether or not to Approve of his or her appointment. Any change in the Superintendent shall require the prior consent of the Awarding Authority. The Contractor shall establish an emergency telephone line by which the Awarding Authority, the Designer, or their respective agents may contact the Superintendent during non-working hours.

### **4. Labor.**

**A.** The Contractor shall employ only competent workers. The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall certify and insure that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and the Contractor and each of its subcontractors and others working on the Project shall furnish documentation of successful completion of said course by employees working with the first certified payroll report for each employee. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. Whenever the Designer shall notify the Contractor in writing that any worker is, in the Designer's opinion, incompetent, unfaithful, disorderly, or otherwise unsatisfactory, such employee shall be discharged from the Work and shall not again be employed on the Project except with the consent of the Designer.

**B.** The Contractor shall employ a sufficient number of workers to carry on the Work with all proper speed in accordance with Laws, the requirements of the Contract Documents, and the Progress Schedule.

**C.** The Contractor shall procure materials from such sources and shall manage its own forces and the forces of its Subcontractors and any sub-subcontractors in such a manner as will result in harmonious labor relations on the Project Site. If union and nonunion workers are employed to perform any part of the Work, the Contractor shall establish and maintain separate entrances to the Site for the use of union and nonunion workers. The Contractor shall cause persons to be employed in the Work who will work in harmony with others so employed. Should the Work be stopped or materially delayed in the Awarding Authority's reasonable judgment due to a labor dispute, the Awarding Authority shall have the right to require the Contractor to employ substitutes acceptable to the Awarding Authority.

### **5. Notices and Permits.**

**A.** The Contractor at its sole cost shall take out and pay for all approvals, permits, certificates and licenses required by Laws, pay all charges and fees, and pay for (or cause the appropriate Subcontractor to pay for) all utilities required for the proper execution of the Work.

**B.** The Contractor shall comply with all Laws and shall give all notices required thereby.

C. Except as otherwise specified in this Contract, it is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable Laws. However, if the Contractor observes that portions of the Contract Documents are at variance with the requirements of Laws, the Contractor shall promptly notify the Designer and Awarding Authority in writing, and necessary changes shall be accomplished by an appropriate Contract Modification.

D. If the Contractor performs Work knowing it to be contrary to Laws without giving such notice to the Designer and Awarding Authority, the Contractor shall bear full responsibility for such Work and all costs attributable thereto, including, without limitation, corrections to the Work.

#### **6. Lines, Marks etc.**

The Contractor shall furnish batter boards and stakes and shall cause to be placed and maintained thereon so as to be easily read, such lines, marks and directions relating to the Work as the Designer shall from time to time direct. The Designer shall establish base lines and benchmarks on the Drawings for the locations of the Work but all other lines and grades shall be determined by the Contractor.

#### **7. Excavation.**

The Contractor shall prevent by sheeting and shoring or bracing, if necessary, any caving or bulging of the sides of any excavation made by the Contractor, leaving sheeting and shoring in place, or if any is removed, filling solid the spaces left thereby.

#### **8. Dewatering/Hoisting/Staging.**

The Contractor shall provide pumping, drainage, and disposal of all water and other flows so that no puddle, nuisance, or damage will be caused by water or flooding. The Contractor shall provide all hoisting equipment and machinery required for the proper execution of the Work. The Contractor shall provide all exterior and interior staging required to be over eight feet in height, except as may be otherwise provided in the Contract Documents.

#### **9. Corrections to the Work; Inspection No Bar to Subsequent Corrections.**

The Designer's inspection of the Work shall not relieve the Contractor of its responsibilities to fulfill the Contract obligations. Defective work may be rejected by the Designer whether or not such work and/or materials have been previously overlooked or misjudged by the Designer and accepted for payment. If the Work or any part thereof shall be found defective at any time before the Final Acceptance of the whole Work, the Contractor shall forthwith cease the performance of any defective work in progress and, whether or not such work is still in progress, shall forthwith correct such defect in a manner satisfactory to the Designer. If any material brought upon the Site for use in the Work, or selected for the same, shall be rejected by the Designer as unsuitable or not in conformity with the Contract Documents, or as damaged by casualty or deteriorated due to improper storage at the Site or to any other factor, the Contractor shall forthwith remove such materials from the Site. The Contractor shall pay for the cost of making good all work or property of other contractors or of the Owner destroyed or damaged by such removal or replacement; repair any injury, defect, omission or mistake in the Work as soon as it is discovered; finish and immediately make good any defect, omission or mistake in the Work; and complete and leave the Work in perfect condition.

#### **10. Sanitary Facilities.**

The Contractor shall provide and maintain sanitary facilities for all persons employed on the Work, beginning with the first worker at the Site. Said facilities shall meet the following requirements unless otherwise specified in the Supplementary General Conditions or Specifications.

A. There shall be no fewer facilities than the number required by applicable Laws;

**B.** Facilities shall be kept in a clean sanitary condition at all times and shall be adequately screened to be inaccessible to flies.  
(**Note:** If existing sanitary facilities at the Site are to be used by the Contractor, this requirement will be modified accordingly in the Supplementary General Conditions or Specifications.)

**11. Temporary Offices.**

**A.** Except as otherwise specified in the Supplementary General Conditions or Specifications, the Contractor shall erect the following temporary offices near the Site as directed by the Designer and adequately furnish and maintain them in a clean, orderly condition:

(1) A Contractor's field office at which Contractor's authorized representative shall be present at all times while work is in progress. Instructions, notices, and other communications delivered there by the Designer or the Awarding Authority shall be deemed delivered to the Contractor. The Contractor shall provide a separate conference room space with a conference table and chairs sufficient to accommodate 12 persons at one time.

(2) Office for the Resident Engineer, either a separate building or trailer. Such office shall be in close proximity to the Contractor's field office, shall be at least 475 square feet in area, and shall be equipped with partitions to separate it from public access, electric lights, heat, air conditioning, window screens, secure locking devices, and a toilet room with a working chemical toilet. Such office shall be equipped with the following furniture and equipment in good condition: 2 lockable steel desks, word processor, 2 swivel chairs, two stools, 2 metal plan racks, plan table at least 32 by 84 inches, 2 metal filing cabinets with locks, 12 feet of 10 inch deep shelving, one accurate Fahrenheit thermometer, one electric water cooler with disposable cups and water supply service, one hard hat for each project representative and 6 visitor hard hats, one dry plain paper copy machine with a legal and standard paper tray, and one calculator with paper print out, all of which shall become the property of the Contractor at the conclusion of the Work. (**Note:** If office space can be assigned in existing buildings at the Project Site, this requirement will be modified accordingly in the Supplementary General Conditions or Specifications.)

**B.** The Contractor shall relocate the Resident Engineer's trailer at no additional cost to the Owner if the need for relocation arises as determined by the Designer.

**12. Contract Documents and Samples at the Site.**

A reasonable number of sets of Contract Documents will be furnished to the Contractor by the Awarding Authority immediately after signing of the Contract, one of which shall be maintained at the Site for reference by authorized representatives of the Awarding Authority. The Contractor shall maintain at the Site for the use and information of the Awarding Authority one record copy of the Drawings, Specifications, Addenda, Change Orders, Approved Shop Drawings, Product Data, Samples, updated Progress Schedule, and all other submittals, all in good order and marked currently to record changes and selections made during construction. These shall be available to the Designer and the Awarding Authority and shall be delivered to the Designer for submittal to the Awarding Authority upon completion of the Work.

**13. Telephones.**

The Contractor shall provide and maintain separate individual telephone service and pay for all calls relating to the Work. Service and equipment shall meet the requirements, if any, of the Supplementary General Conditions and Specifications and shall include provisions for incoming and outgoing calls: (1) in the Contractor's field office for the use of its authorized agents and (2) in the Resident Engineer's office for the use of the Designer and authorized agents of the Owner.

**14. Health, Safety, and Accident Prevention**

**A.** In performing the Work, the Contractor shall:

- (1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the U.S. Secretary of Labor by regulation;
- (2) Protect the lives, health, and safety of other persons; and
- (3) Prevent damage to property, materials, supplies, and equipment.

**B.** For these purposes, the Contractor shall:

- (1) Comply with 84 Stat. 1590, the "Occupational Safety and Health Act of 1970" (OSHA) and with regulations and standards issued by the U.S. Secretary of Labor at 29 CFR Part 1926; and
- (2) Comply with the Trench Safety Law set forth in M.G.L. c. 82A and regulations promulgated by the Departments of Public Safety (DPS) and Occupational Safety (DOS) in 520 CMR 14.00 et. seq.; the CM shall execute a Trench Application and Permit form with the execution of its contract.
- (3) Include the terms of this Section 14 in every subcontract so that such terms will be binding on each subcontractor.
- (4) Designate by notice to the Awarding Authority a responsible member of its organization at the Site whose duties shall include ensuring safety, implementation of Contractor's Safety Plan referenced below and preventing accidents.

**C.** The Contractor shall maintain an accurate record of exposure data on all accidents incident to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904. Without limiting the foregoing, the Contractor shall submit to the Awarding Authority without delay verbal and written reports of all accidents involving bodily injury or property damage arising in connection with the Work.

**D.** In any emergency affecting the safety of persons or property the Contractor shall immediately act in the exercise of reasonable judgment to prevent threatened damage, injury, or loss. The Contractor shall immediately notify the Awarding Authority of such emergency.

**E.** The Contractor shall be responsible for its Subcontractors' compliance with the provisions of this Section 14.

**F.** Before commencing any portion of the Work the Contractor shall submit a written Project-specific plan for implementing this Section 14. The plan shall include an analysis of the significant hazards to life, limb and property inherent in the performance of the Work and a plan for controlling these hazards..

**G.** Without limiting the foregoing provisions of this Section 14, the Contractor shall comply with all health and safety Laws applicable to the Work. Without limitation,

- (1) If the Contractor uses, stores or encounters toxic or hazardous substances it shall comply with M.G.L. c. 111F, s. 2, the "Right to Know" law and regulations promulgated by the Department of Public Health, 105 CMR 670, the Department of Environmental Protection, 310 CMR 33, and the Department of Labor and Workforce Development, 441 CMR 21; and shall post a Workplace Notice obtainable from the Department of Labor and Workforce Development.
- (2) The Contractor shall comply with the Federal Resource Conservation and Recovery Act, the Federal Comprehensive Environmental Response, Compensation and Liability Act, M.G.L. c. 21C, M.G. L. c. 21E, and any other Laws affecting toxic or hazardous materials, solid, special or hazardous waste (collectively "Hazardous Materials Laws). Should the Contractor discover unforeseen materials subject to Hazardous Materials Laws at the Site, the Contractor shall immediately comply with any and all requirements for dealing with such materials and notify all required governmental authorities and the Awarding Authority of such discovery.
- (3) The Contractor shall be responsible for the location of all utilities in connection with the Work. Without limiting the foregoing, the Contractor shall

comply with Dig-Safe Laws. Dig-Safe is the Utility Underground Plant Damage Prevention System, 331 Montvale Road, Woburn, MA, 01801, 1-888-344-7233. The Contractor shall notify Dig-Safe of contemplated excavation, demolition, or explosive work in public or private ways, and in any utility company right of way or easement, by certified mail, with a copy to Department of Environmental Protection (DEP). This notice shall be given at least 72 hours prior to the work, but not more than sixty days before the work is to be done. Such notice shall state the name of the street or the route number of the way and shall include an accurate description of the location and nature of the proposed work. Dig-Safe is required to respond to the notice within 72 hours of receipt by designating the location of pipes, mains, wires or conduits at the Site. The Contractor shall not commence work until Dig-Safe has responded. The work shall be performed in such manner and with reasonable precautions taken to avoid damage to utilities under the surface at the work location. The Contractor shall provide the Superintendent with current Dig-Safe regulations, and a copy of M.G.L. c. 82, s. 40. Any costs related to the services performed by Dig-Safe shall be borne by the Contractor.

(4) The Contractor shall comply with M.G.L. c. 149, s. 129A, relative to shoring and bracing of trenches.

**H.** Without limiting the Contractor's responsibilities described above, the Contractor shall take all reasonable precautions for the safety of, and the prevention of injury or damage to (1) all agents and employees and contractors on the Work and all other persons who may be affected thereby including the general public, (2) all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the Site, under the care custody or control of the Contractor or any of its Subcontractors or any contractors directly or indirectly contracting through any of them, and (3) other property at the Site or adjacent thereto, including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of the Work. The Contractor shall promptly remedy all damage or loss to any such property caused in whole or in part by the Contractor, any Subcontractor, or anyone directly or indirectly contracted or employed by any of them or by anyone for whose acts any of them may be liable. Without limiting the foregoing, the Contractor shall:

- (1) post and maintain adequate danger signs and other warnings against hazards;
- (2) promulgate safety regulations and give appropriate notices to the Awarding Authority and users of adjacent utilities and property;
- (3) insure the adequate strength and safety of all scaffolding, staging and hoisting equipment, temporary shoring, bracing and tying;
- (4) protect adjoining private or public property;
- (5) provide barricades, temporary fences, and covered walkways required by prudent construction practices, Laws and/or the Contract Documents;
- (6) furnish approved hard hats and other personal protective equipment, furnish approved first aid supplies, furnish the name of the first aid attendant, and maintain a posted list of emergency facilities;
- (7) provide proper means of access to property where the existing access is cut off by the Contractor;
- (8) maintain from the beginning of any darkness or twilight through the whole of every night sufficient lights on or near any obstruction so as to guard and protect travelers from injury from such obstruction;
- (9) maintain adequate security at the Site so as not to expose the Work and surrounding property to vandalism or malicious mischief;
- (10) provide adequate fire protection procedures during the use of cutting torches, welding equipment, plumbers' torches and other flame and spark producing apparatus;
- (11) take prompt action to correct any dangerous or hazardous conditions.

**I.** The Contractor shall not use or store explosives in the performance of the Work unless the Contractor first obtains the Awarding Authority's prior written

specific Approval. If the Awarding Authority Approves the use or storage of explosives during the performance of the Work, the Contractor shall first comply with all Laws and obtain all permits, approvals, and certificates required in connection with the same and shall exercise best efforts, including but not limited to the employment and supervision of properly qualified personnel, to prevent damage, injuries, and accidents involving said explosives.

**J.** The Contractor shall not permit cutting or welding in or immediately adjacent to existing property of the Owner, Awarding Authority or of anyone else without the Awarding Authority's prior Approval in each instance.

### **15. Debris and Chemical Waste.**

**A.** The Contractor shall not permit the accumulation of interior or exterior debris. The Contractor shall keep the Work area clean at all times. Without limitation, garbage shall be removed daily.

**B.** The Contractor shall properly classify and remove debris and waste from the Site and transport and dispose of it, all in accordance with Laws, employing a qualified and properly licensed transporter, at any landfill, disposal or recycling facility licensed under applicable Laws, including without limitation, hazardous materials laws. The Contractor shall make all arrangements and give and obtain all notices, communications, documentation, permits, certificates, and approvals necessary for said disposal from the owner or officials in charge of such landfills, disposal or recycling facilities. The Contractor shall bear all fees and costs in connection with such classification, removal, transportation, disposal and storage. The Contractor shall not permit any storage of debris or waste except in accordance with Laws.

**C.** The Contractor shall not permit any open fire on the Site.

**D. Chemical Waste:** Chemical waste shall be stored in corrosion resistant containers, removed from the Site, and disposed of not less frequently than monthly unless more frequently required by Laws, including without limitation hazardous materials laws, or by the Supplementary General Conditions or Specifications. Disposal of chemical waste shall be performed in accordance with requirements of the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP). Fueling and lubricating of vehicles and equipment shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants shall be disposed of in accordance with procedures meeting all applicable Laws. The Contractor shall immediately notify the Designer of any hazardous materials release large enough to require reporting under applicable Laws. The Contractor shall be responsible for immediately cleaning up in accordance with Laws any oil or hazardous materials releases resulting from its operations. Any costs incurred in cleaning up any such releases shall be borne by the Contractor.

### **16. Weather Protection (M.G.L. c. 149, s. 44G and 44F(1)).**

The Contractor shall furnish and install "weather protection," which means temporary protection of that Work adversely affected by moisture, wind and cold. Weather protection shall be achieved by covering, enclosing and/or heating working areas such that a minimum temperature of 40 degrees Fahrenheit is maintained at the working surface during the months of November through March in order to permit construction to be carried on during such period in accordance with the Progress Schedule. After the building or portion thereof is completely enclosed by either permanent construction or substantial temporary materials having a resistance comparable to the specified permanent construction, the Contractor shall provide heat therein of not less than 55 degrees F. nor more than 75 degrees F. The foregoing provisions do not supersede any specific requirements for methods of construction, curing of materials and the like. Such weather protection shall be consistent with the Progress Schedule, shall permit the continuous progress of the Work necessary to maintain an orderly and efficient sequence of construction operations, shall include one thermometer for every 2,000 square feet of floor space or fraction thereof, shall be subject to the Approval of the Awarding Authority, and shall meet such additional requirements as may be specified by DCAMM and by the Supplementary General Conditions or the Specifications.



**17. Furnishings and Equipment.**

When, in the opinion of the Designer, any portion of the Work is in a reasonable condition to receive fittings, furniture, or other property of the Owner not covered by this Contract, the Contractor shall allow the Awarding Authority to bring such fittings, furniture, and/or other property into such portions of the Work and shall provide all reasonable facilities and protection thereof. No such occupancy shall be construed as interfering with the provisions relating to time of completion, or as constituting an acceptance of the whole or any part of the Work. Any furniture or fittings so installed shall be placed in the Work at the risk of the Awarding Authority except that the Contractor shall be liable for damages or losses to such furniture or fittings to the extent such damages or losses arise in whole or in part from the negligence or intentional misconduct of Contractor, Subcontractors, their agents and/or employees, or anyone for whose acts Contractor is responsible.

**18. Form for Sub-contract.**

The Contractor when subcontracting with sub-bidders filed pursuant to M.G.L. c. 149, s.44F shall use the form for sub-Contract in M.G.L. c. 149, s. 44F(4) (c). The Contractor shall not interpret paragraph 3 of the statutory form of Subcontract to require such sub-bidders to provide insurance with limits higher than the limits that are required by Article XIV of these General Conditions of the Contract assuming that the term "Contractor" refers to the sub-bidder and that the term "Contract Price" refers to the sub-bidder's price stated in paragraph 1 of the statutory form of Subcontract.

**19. Sales Tax Exemption and Other Taxes.**

All building materials and supplies as well as the rental charges for construction vehicles, equipment and machinery rented exclusively for use on the Site, or while being used exclusively for the transportation of materials for the Work are entitled to an exemption from sales taxes under M.G.L. c. 64H, s. 6(f). The Contractor shall take all action required to obtain the benefit of such sales tax exemption. The Contractor shall bear the cost of any sales taxes that Contractor incurs in connection with the Work and the Awarding Authority shall not reimburse the Contractor for any such taxes. The exemption number assigned to the Contractor as an exempt purchaser shall be provided to the Contractor by the Awarding Authority upon the written request of the Contractor.

**20. Final Cleaning.**

At the completion of the Work, the Contractor shall remove all waste materials, rubbish, tools, equipment, machinery and surplus materials, and professionally clean all sight-exposed surfaces so that the Work is clean and ready for occupancy. Subsequent to installation of User Agency furniture, telephones, and equipment, the Contractor shall provide such additional cleaning as may be necessary to remove any soil resulting from installation of such furniture, telephones and equipment.

**21. Maintenance Data.**

Subject to such additional requirements as may be provided in the Supplementary General Conditions or Specifications, the Contractor shall compile 3 complete and identical binders of operating and maintenance data for the entire Work. The Contractor shall submit record maintenance data to the Designer for approval, shall submit approved maintenance data to the Awarding Authority, and shall instruct and train the User Agency's personnel in proper inspection and maintenance procedures.

**22. Closeout Procedures.**

The Contractor shall take all actions and submit all items required for the issuance of the Certificate of Agency Use and Occupancy and Final Acceptance as specified in the Contract Documents.

**23. Risk of Loss.**

The Contractor shall bear all risk of loss to the Work during the term of the Contract except for any portion of the Work as to which the Certificate of Agency Use and Occupancy has been issued pursuant to Article VI of these General Conditions of the Contract. Nothing herein shall limit the Contractor's responsibilities under Article IX or XV of these General Conditions of the Contract.

**24. LEED Requirements**

Contractor understands that, pursuant to Executive Order No. 484, all new construction and renovation projects over 20,000 square feet must, at a minimum, meet a Massachusetts LEED Plus building standard, and that smaller projects must meet the minimum energy performance standards for advanced buildings established by the Commonwealth of Massachusetts Sustainable Design Roundtable. Furthermore, Contractor understands that the Massachusetts LEED Plus standard or a higher LEED standard applies to all projects overseen by the Massachusetts Division of Capital Asset Management and Maintenance, as well as all projects built on state land for use by state agencies. Contractor must document compliance with this executive order and Project LEED certification standards as described in the project specifications.

**ARTICLE V: MATERIALS AND EQUIPMENT**

**1. Materials Generally.**

**A.** Unless otherwise specifically provided in the Contract Documents, the Contractor shall provide and pay for materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

**B.** Materials and equipment to be installed as part of the Work (both or either of which are hereinafter referred to as "materials") shall be new, unused, of recent manufacture, assembled, and used in accordance with the best construction practices. The Contractor shall inform himself as to, and shall comply with, the provisions of M.G.L. c. 7, s. 23A, as amended, and shall abide by the same and all applicable rules, regulations and orders made thereunder in relation to the purchase of supplies and materials in the execution of the Work, including the provisions of M.G.L. c.7, s. 22, paragraph 17 which provides that there be "*a preference in the purchase of supplies and materials, other considerations being equal, in favor, first, of supplies and materials manufactured and sold within the Commonwealth, and, second, of supplies and materials manufactured and sold elsewhere within the United States.*"

**2. Shop Drawings, Product Data, and Samples.**

**A.** The Contractor shall furnish to the Designer all samples of the materials to be used in the execution of the Work as required by the Contract Documents. The Contractor shall furnish to the Designer in a timely manner all coordination Drawings, shop details, Shop Drawings, and setting diagrams which may be necessary for acquiring and installing materials. These shall be reviewed as required by the Designer. A minimum of four (4) copies shall be submitted for final approval, one of which shall be returned to the Contractor, one to the Resident Engineer, one to the Awarding Authority and one filed with the Designer. The inspection and approval by the Designer of Shop Drawings, etc. shall be general and shall in no way relieve the Contractor from responsibility for proper fitting, coordinating, construction, and construction sequencing. The Contractor shall furnish to the Designer such information and vouchers relative to the Work, the materials therefor, and the persons employed thereon, as the Designer shall from time to time request.

**B.** Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. The purpose of their submission is to demonstrate for those portions of the

Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

**C.** The Contractor shall review, approve, and submit to the Designer, Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Awarding Authority or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents or which do not comply with the Contract Documents may be returned without action. The Contractor's attention is directed to the provisions of Section 4 of this Article V and to the Specifications.

**D.** The Contractor shall prepare and keep current for the Designer's approval a schedule of submittals which is coordinated with the Progress Schedule and allows the Designer reasonable time to review submittals.

**E.** The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Designer. Such Work shall be in accordance with Approved submittals.

**F.** By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements, and field construction criteria related thereto and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

**G.** The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Designer's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Designer in writing of such deviation at the time of submittal and the Awarding Authority has given explicit written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals by the Designer's or the Awarding Authority's actions.

**H.** The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Designer on previous submittals.

**I.** Informational submittals upon which the Designer is not expected to take responsive action may be so identified in the Contract Documents.

**J.** When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, such certification must be stamped by a registered Massachusetts professional in the discipline required. The Designer shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

**K.** Materials furnished or used or employed under the Contract must be equal in quality to the samples furnished and be satisfactory to the Designer.

### **3. Tests.**

**A.** Any material to be used in the Work may be tested or inspected at any time by the Designer with the prior Approval of the Awarding Authority and may be rejected if it fails to comply with specified tests. The Awarding Authority shall pay for all testing of specified material. If the Contractor requests permission to use a material that was not specified, then the Contractor shall pay for such testing. The cost of testing of materials that fail the testing criteria shall be borne by the Contractor

**B.** The Contractor shall notify the Designer and the Awarding Authority of the proposed sources of materials in time to permit all required testing and inspection before the material is needed for incorporation into the Work. The Contractor shall have no claim arising from Contractor's failure to designate the proposed source or to order the material in time for adequate testing and inspection. Necessary arrangements shall be made to permit the Designer to make factory, shop or other inspection of materials or equipment ordered for the Work in process of manufacture or fabrication, or in storage elsewhere than the Site.

#### **4. "Or Equal" Submissions.**

**A.** Where products or materials are prescribed by manufacturer name, trade name, or catalog reference, the words "or Approved equal" shall be understood to follow. An item shall be considered equal to the item so named or described if in the opinion of the Awarding Authority (a) it is at least equal in quality, durability, appearance, strength and design, (b) it performs at least equally the function imposed in the general design for the Work, and (c) it conforms substantially, even with deviations, to the detailed requirements for the items as indicated by the Specifications. Any structural or mechanical changes made necessary to accommodate products or materials substituted as an "or equal" shall be at the expense of the Contractor. "Approved equal" shall mean an item with respect to which the Awarding Authority shall have issued a written statement to the Contractor to the effect that the item is, in the Awarding Authority's opinion, equal within the meaning of this paragraph to that prescribed in the Contract Documents.

**B.** The Contractor shall be responsible for providing the Designer with any information and test results that the Designer reasonably requires to determine whether or not a material is equal to a material named or described in the Contract Documents.

**C.** Whenever the Contractor submits a material for approval as a substitute for a material named or described in the Contract Documents, such submission shall be made at least one hundred twenty (120) days prior to the date the materials will be used in the Work. In no event shall the Contractor maintain a claim for delays based upon the Designer's review of such substituted materials if the Contractor has failed to comply with the one hundred twenty (120) day submission requirement.

**D.** The Contractor shall save the written calculations, pricing information, and other data that the Contractor used to calculate the General Bid (the "Bid Pricing Materials") for at least six years after the Awarding Authority makes Final Payment under this Contract. No increase in the Contract Price shall be allowed for any material later found to have been improperly rejected as not being equal unless the Contractor can show persuasive evidence that the rejection increased the Contractor's costs over those provided for in the Bid Pricing Materials, net of all savings the Contractor obtained by substituting other "or-equal" items. Without limiting the foregoing, if the Awarding Authority rejects a proposed substitution on the basis that the item is not equal and if after the Contractor complies with the appeal procedures required by law, DCAMM regulation, and by the Contract Documents, the appropriate authority finds that the proposed substitution was equal, the Contract Price may be increased only to the extent that (1) the item that the Contract Documents specifically require costs more than the item later approved as equal, (2) the Bid Pricing Materials prove that the Contractor calculated its bid using the cost of the item later found as equal, (3) any increase is reduced by any cost that the Contractor would have incurred for structural or mechanical changes necessary to accommodate the substitute item, (4) the Contractor shall not be entitled to any adjustment for overhead and profit, (5) any increase must exceed the aggregate amount that the Contractor saved using products or materials that the Awarding Authority approved as equal under this Contract. In calculating the Contractor's aggregate saving under the preceding clause (5), the Contractor shall provide the Awarding Authority with the Bid Pricing Materials and a calculation based on the Bid Pricing Materials that compare the price (stated in the Bid Pricing Materials) of each item replaced with an "or equal" item, with the cost of the approved equal item, specifically describes all costs that Contractor would have incurred making structural or mechanical changes to include within the Work the item later found to have been improperly rejected and copies of all plans, specifications, shop Drawings, and other design documents that the Awarding Authority deems necessary or desirable.

#### **5. Delivery and Storage of Materials; Inspection.**

**A.** Materials and equipment shall be progressively delivered to the Site so that there will be neither delay in the progress of the Work nor an undue accumulation of materials that are not to be used within a reasonable time and so that their security, quality, and fitness of the materials for the Work is preserved.

**B.** Materials stored off Site shall be insured and stored at the expense of the Contractor so as to guarantee the preservation of their security, quality and fitness for the Work. Without derogating from the Contractor's responsibilities in the previous sentence, when necessary to avoid deterioration or damage, material (on or off Site) shall be placed on wooden platforms or other hard clean surfaces and not on the ground and shall be properly protected.

**C.** Expenses for inspection of material by the Designer and/or the Awarding Authority personnel including travel, quarters, and subsistence shall be borne by the Contractor requesting the inspection of material stored outside the Commonwealth of Massachusetts as part of the Contract Price. The policy of the Awarding Authority precludes the payment for material stored outside the boundaries of Massachusetts except in extremely limited circumstances with the express written consent of the Awarding Authority. If the Contractor requests an inspection of material stored outside the Commonwealth of Massachusetts, the Awarding Authority will initially pay for all expenses of inspecting the material incurred by the Designer and/or Awarding Authority's personnel including travel, quarters, and subsistence. The Awarding Authority will then give Contractor an invoice for those costs and the Contractor shall submit a credit Change Order for the amount of those expenses.

**D.** Stored materials either at the Site or at some other location agreed upon in writing shall be so located as to facilitate prompt inspection and even though approved before storage, may again be inspected prior to their use in the Work.

**E.** All storage sites shall be restored to their original condition by the Contractor at the Contractor's expense.

**F.** The Contractor shall take charge of and be liable for any loss of or injury to the materials for his use delivered to or in the vicinity of the place where the Work is being done, whether furnished by the Owner or otherwise; the Contractor shall notify the Designer as soon as any such materials are so delivered, allow them to be examined by the Designer, and furnish workers to assist therewith.

#### **6. Defective, Damaged, or Deteriorated Materials and Rejection Thereof.**

The Designer may reject materials if the Designer reasonably determines that such materials do not conform to the Contract Documents in any manner, including but not limited to materials that have become damaged or deteriorated from improper storage whether or not such materials have previously been accepted. The Contractor at its own expense shall remove rejected materials from the Work. No rejected material, the defects of which have been subsequently corrected, shall be used except with the written permission of the Designer. Should the Contractor fail to remove rejected material within a reasonable time, the Designer and/or Awarding Authority may, in addition to any other available remedies, remove and/or replace the rejected material, and to deduct the cost of such removal and/or replacement from any moneys due or to become due the Contractor. No extra time shall be allowed for completion of Work by reason of such rejection. The inspection of the Work shall not relieve the Contractor of any of its obligations herein prescribed, and any defective Work shall be corrected. Work not conforming to the Contract Documents may be rejected notwithstanding that such Work and materials have been previously overlooked or misjudged by the Designer and accepted for payment. If the Work or any part thereof shall be found defective at any time before Final Acceptance of the whole Work, the Contractor shall forthwith make good such defect in a manner satisfactory to the Designer. Nothing in the Contract shall be construed as vesting in the Contractor any property rights in the materials used after they have been attached or affixed to the Work or the Site; but all such materials shall upon being so attached or affixed become a property of the Owner.

### **ARTICLE VI: PROSECUTION AND PROGRESS**

#### **1. Beginning, Progress Schedule, and Completion of Work.**

**A.** The Contract time shall commence upon the date specified in the Notice to Proceed. The Contractor shall begin Work at the Site within ten days of said date unless otherwise ordered in writing by the Awarding Authority.

**B.** Within ten days after the Work has commenced, the Contractor shall submit to the Designer and to the Awarding Authority, a progress schedule for the term of the Contract as required by the Contract Documents, showing in detail his proposed progress for the construction of the various parts of the Work and the proposed times for receiving required materials. Upon Approval by the Awarding Authority, said schedule shall constitute the Progress Schedule. The Contractor shall at the end of each month, or more often if required, furnish to the Designer and to the Awarding Authority a schedule meeting the requirements of the Specifications showing the actual progress of the parts of the Work in comparison with the Progress Schedule.

**C.** Time is of the essence of this Contract. The Work shall be completed within the time specified in Article 4 of the Owner - Contractor Agreement. Should the Contractor require additional time to complete the Work, the Contractor shall document the reasons therefor and submit a written request for an extension of time within 20 days of the occurrence of the event alleged to be the cause of the delay, as provided in this Article and in Article VII of these General Conditions of the Contract. Failure to submit said written request within the time required by the preceding sentence shall preclude the Contractor from subsequently claiming any time extension due to said delay.

**D.** If, in the opinion of the Designer or the Awarding Authority, the Contractor fails to comply with the Progress Schedule, the Awarding Authority may give the Contractor a notice specifying the time limits and performance standards that the Contractor is failing to meet whereupon (1) the Contractor shall, if the notice requires, discontinue all or any portion of the Work (which discontinuance shall neither terminate the Contract nor give the Contractor any claim for an increase in the Contract Price, damages, or an extension of any completion deadlines); or (2) at Contractor's sole cost increase the work force, equipment and plant, or any of them, employed on the whole or any part of the Work, to the extent required by such notice, and employ the same from day to day until the completion of the Work or such part thereof, or until the failure regarding the rate of progress, in the opinion of the Designer or the Awarding Authority, shall have been sufficiently corrected.

**E.** If, in the opinion of the Awarding Authority, the Contractor fails to comply with the Progress Schedule, and whether or not the Awarding Authority shall have given the Contractor a notice described in D above, the Awarding Authority may (but shall not be required to) give the Contractor notice of such failure and five days to cure the same. Unless the Contractor shall within that five days take all necessary steps to do so (including, if the Awarding Authority requires, increasing its forces, equipment and plant) and continue to do so until in the opinion of the Awarding Authority the failure is corrected, the Awarding Authority may at the Contractor's expense and without terminating this Contract take exclusive or joint possession of all or a portion of the Site and employ and direct the labors of existing or such additional forces, equipment and plant as may in the Designer's or Awarding Authority's opinion be necessary to insure the completion of the Work or such part thereof within the time specified in the Contract Documents or at the earliest possible date thereafter. The Awarding Authority may exercise its rights under this Article at any time and from time to time without waiving any of its rights under this Contract, at law or in equity, including, without limitation, the right to deem this Contract terminated or to order the Contractor to discontinue the Work at any time thereafter. The Contractor shall continue to perform the remaining Work under this Contract even if the Awarding Authority elects to have another contractor perform a portion of the Work under this Article.

**F.** The Awarding Authority shall deduct the cost of any actions the Awarding Authority takes under this Article from any amount then due or which might have become due to the Contractor under this Contract had the Contractor performed as required. On demand, the Contractor shall pay the Awarding Authority any amount by which the cost of completing all or any portion of the Work exceeds the amount

attributable to that Work under the Contract Documents. The Awarding Authority's sole goal will be to complete the Work that it elects to complete within the time limits stated in the Contract or at the earliest possible date thereafter. Consequently, the Awarding Authority shall have no obligation to obtain competitive bids or the lowest cost for completing the Work or any part thereof. The Awarding Authority's election to complete all or part of the Work shall not release the Contractor from any liability for failure to complete the Work as the Contract Documents require, and shall not entitle the Contractor to a claim for an increase in the Contract Price or an extension of the time for completing the Work. If the cost that the Awarding Authority incurs in completing all or any portion of the Work is less than the amount that the Contract Documents attribute to that Work, the Awarding Authority will pay or credit the difference to the Contractor, less any other costs and expenses that the Awarding Authority incurs, including the cost of supervision, and the Designer's and attorneys' fees and costs.

## **2. Failure to Complete Work on Time - Liquidated Damages.**

**A.** If liquidated damages are specified in the Owner - Contractor Agreement, the Awarding Authority has determined that its damages as a result of Contractor's failure to complete the Work to the point at which it qualifies for the issuance of a Certificate of Agency Use and Occupancy will be difficult or impracticable to ascertain. Accordingly, if the Work is not completed to such point by the date specified in this Contract, the Contractor shall pay to the Awarding Authority the sum designated as liquidated damages in the Contract for each and every calendar day that the Contractor is in default in completing the Work to such point. Such moneys shall be paid as liquidated damages, not as a penalty, to cover losses and expenses to the Awarding Authority and/or the User Agency resulting solely from the fact that the Work is not completed on time.

**B.** Similarly, if the Contract states that by a specified date a designated portion of the Work shall be prosecuted to the point at which it qualifies for the issuance of a Certificate of Agency Use and Occupancy, and if such portion has not been prosecuted to such point by said date, the Contractor shall pay to the Awarding Authority the sum designated in the Contract for each calendar day that the Contractor is in default in completing such portion of the Work to such point. Such moneys shall also be paid as liquidated damages not as a penalty, to cover losses and expenses to the Owner resulting solely from the fact that the Work is not completed on time.

**C.** The Awarding Authority may recover such liquidated damages by deducting the amount thereof from any moneys due or that might become due the Contractor, and if such moneys shall be insufficient to cover the liquidated damages, then the Contractor or the Surety shall pay to the Awarding Authority the amount due.

**D.** Permitting the Contractor to continue and finish the Work or any portion of it after the time fixed in the Contract for its completion shall not be deemed as a waiver of any of the Owner's rights hereunder, at law or in equity.

**E.** Liquidated damages or a portion thereof may be waived by the Awarding Authority if the Contractor submits evidence satisfactory to the Awarding Authority that the delay was caused solely by conditions beyond the control of the Contractor and that the Awarding Authority has not suffered any damages as a result of said delay.

**F.** Failure by the Awarding Authority to specify a sum as liquidated damages in the Owner - Contractor Agreement, or the insertion of "N/A" or "none" in the space provided therein for liquidated damages, shall not be deemed a waiver of the Awarding Authority's right to recover actual damages arising from the Contractor's failure to complete the Work on time.

## **3. Delays; Statutory Provisions (M.G.L. c. 30, s. 39O).**

**A.** Notwithstanding any provision of this Contract to the contrary, except as otherwise provided by law as set forth in paragraph B below, the Contractor shall not be entitled to increase the Contract Price or to receive damages on account of any hindrances or delays, avoidable or unavoidable; but if any delay is caused in the

opinion of the Designer by the Awarding Authority, the Contractor shall be entitled to an extension of time. The length of the extension shall be sufficient in the opinion of the Designer for the Contractor to complete the Work. Although no delay shall increase the Contract Price, the Awarding Authority may require that any change in the date by which the Contractor must complete all or any part of the Work be processed on a standard Change Order form.

**B.** If a suspension, delay, interruption or failure to act of the Awarding Authority increases the cost of performance to any Subcontractor, that Subcontractor shall have the same rights against the Contractor with respect to such increase as the Contractor shall have against the Awarding Authority by virtue of (a) and (b) of M.G.L. c. 30, s. 39O set forth below, but nothing in provisions (a) and (b) shall alter any other rights which the Contractor or the subcontractor may have against each other. As used in the statutory language of (a) and (b) below, "contract" means this Contract, "general contractor" means the Contractor and "awarding authority" means the Awarding Authority:

*"(a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided, however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.*

*(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act or failure to act involved in the claim."*

#### **4. Use and Occupancy Prior to Final Acceptance.**

**A.** The Contractor agrees to the use and occupancy of the Project or any portion thereof before Final Acceptance of the Work by the Awarding Authority.

**B.** The Awarding Authority and the User Agency will cooperate with the Contractor with respect to the completion of the Work by taking such reasonable steps as may be possible to avoid interference with the Contractor's Work provided that they do not interfere with the proper functioning of the facility.

**C.** The Contractor shall not be responsible for wear and tear or damage resulting solely from temporary occupancy.

**D.** Use and occupancy of any part of the Work prior to Final Acceptance by the Awarding Authority shall not relieve the Contractor from maintaining the required payment and performance bonds and insurance (to the extent that insurance is required to be maintained after Substantial Completion) required by this Contract.

#### **5. Certificate of Agency Use and Occupancy.**

**A.** When the Work, or portion thereof which the Awarding Authority agrees to accept separately has reached the state of Substantial Completion as shown on Approved payment request, the Contractor shall develop, with the participation of the Designer and the Awarding Authority, the Punch List identifying those items of unfinished or unacceptable Work that remain to be performed or corrected under the Contract.

**B.** Before the Work shall be deemed completed to the point where it is ready for the issuance of a Certificate of Agency Use and Occupancy, the Contractor shall:



- (1) Provide Contractor's proposed Punch List containing a statement of the reason for each item listed thereon;
- (2) Advise the Awarding Authority of proposed changes in insurance in accordance with the provisions of this Contract, and provide to the Awarding Authority evidence of Contractor's Completed Operations insurance coverage to the extent required by the Contract Documents;
- (3) Execute and submit a notarized warranty on a form provided by the Awarding Authority meeting the requirements of Article IX of these General Conditions of the Contract, to commence upon the date of the issuance of the Certificate of Agency Use and Occupancy for the Work or the designated portion thereof, unless otherwise provided in the Certificate of Agency Use and Occupancy;
- (4) Submit signed special warranties and warranties of longer than one year as required by the Contract Documents;
- (5) Submit signed maintenance agreements for all portions of the Work specified to receive maintenance after the issuance of the Certificate of Agency Use and Occupancy;
- (6) Submit all preliminary record Drawings the Awarding Authority and Designer written acknowledgements from appropriate User and documents and framed data in the forms required by the Contract Documents;
- (7) Complete all items required to be completed by the Department of Public Safety and obtain a Certificate of Occupancy from the Department of Public Safety (or, if the Awarding Authority is a municipality, the building department having jurisdiction) and similar releases which permit the User Agency and the Awarding Authority full and unrestricted use of the areas claimed to be ready for occupancy;
- (8) Deliver specified maintenance stocks of materials, required spare parts, and all special tools furnished by manufacturers to persons designated by the Awarding Authority and obtain written receipts for same;
- (9) Make final changes of lock cylinders or cores and advise the Awarding Authority of the change of project security responsibility;
- (10) Complete start-up of systems and instruct User Agency personnel on proper operation and routine maintenance of all systems and equipment; obtain and submit to Agency personnel that start-up and instruction have been completed;
- (11) Remove all remaining temporary facilities that are no longer needed, surplus materials, and debris; (the Contractor shall not remove construction offices and trailers without the prior Approval of the Awarding Authority);
- (12) Submit final utility meter readings and similar information and advise the User Agency and the Awarding Authority of the change of responsibility for utility charges and payments upon the issuance of the Certificate of Agency Use and Occupancy;
- (13) Complete final clean-up of all Work, restoration of damaged finishes, and replacement of all damaged and broken glass not listed on the Contractor's Punch List.
- (14) Complete such other items as may be called for in the Supplementary General Conditions, if any, or in the Specifications.

**C.** After completing the items specified in subsection A above, the Contractor shall make a written request for the Designer's inspection for a Certificate of Agency Use and Occupancy in accordance with the Contract Documents. The Designer shall review the submittals and the Work and shall either 1) sign a Certificate of Agency Use and Occupancy or 2) notify the Contractor of incomplete and/or incorrect Work that must be completed and corrected prior to the issuance of the Certificate of Agency Use and Occupancy. The Designer shall notify the Contractor of any additions to the Punch List. In connection with the execution of the Certificate of Agency Use and Occupancy the Designer shall assign dollar values to each item on the Punch List. Failure to include any incomplete or defective item on the Punch List shall not relieve the Contractor of the obligation to complete all Work in accordance with the Contract Documents.

## **6. Final Acceptance of the Work.**

**A. Prerequisites for Final Acceptance.** After the issuance of a Certificate of Agency Use and Occupancy for the entire Work, and after the Contractor has completed all of the Work required by this Contract, including Change Orders and Punch List Items, the Contractor shall submit the following completed items to the Awarding Authority together with such additional items as may be specified in the Contract Documents:

- (1) A completed Final Application for Payment showing a final accounting of all changes in the Work, on the form provided by the Awarding Authority.
- (2) Certification and satisfactory evidence that all taxes, fees, and similar obligations have been paid.
- (3) Consent of the Surety to Final Payment executed by applicable bonding companies.
- (4) Certified copy of the Punch List stating that the Contractor has completed or corrected every item listed.
- (5) Evidence of Contractor's continuing Completed Operations Insurance coverage to the extent required by the Contract Documents.
- (6) All final record Drawings and documents in the forms specified by the Contract Documents.
- (7) A notarized certification that all purchases made under the tax exemption certificate were legitimate and entitled to exemption.
- (8) Written certifications from the Department of Public Safety (or if the Awarding Authority is a municipality, the building department having jurisdiction) and the Designer to the effect that: a) the Work has been inspected for compliance with the Contract Documents and has satisfied the Department of Public Safety; b) all equipment and systems included in the Work have been tested in the presence of the Designer and are operational and satisfactory; c) the Work is completed and ready for final inspection.
- (9) Such other items as may be required by the Contract Documents.

**B. Reinspection; Final Acceptance.** After notification from the Contractor that all remaining contract exceptions, omissions and incompletions have been completed (with the exception of Contractor's continuing warranty, insurance, indemnification, and such other obligations as are intended by the terms of the Contract Documents to extend beyond the date of Final Acceptance), the Awarding Authority and the Designer shall inspect the Work to verify the completion of the same. If the Work is satisfactory, the Awarding Authority shall prepare a Certificate of Final Acceptance or shall notify Contractor of items which remain to be completed prior to Final Acceptance.

## **7. One-Year Warranty Repair List and Inspection.**

Approximately 30 days prior to the expiration of the comprehensive one-year warranty period, the Contractor shall schedule an appointment with the Awarding Authority for a re-inspection of the Work with the Awarding Authority, and shall thereafter inspect the work at the time scheduled. Based on this inspection and on prior inspections, the Awarding Authority shall issue a "Warranty Repair List" of items to be corrected by the Contractor. The Contractor shall make the repairs and/or replacements listed within 30 days of the issuance of the Warranty Repair List unless otherwise agreed by the Awarding Authority in writing.

## **ARTICLE VII: CHANGES IN THE WORK**

### **1. Change Orders Generally.**

**A.** No changes in the Work shall be made in absence of a Change Order (sometimes called a "Notice to Proceed") defined in Article I of these General Conditions of the Contract, directing the Contractor to perform such changes. A request for a change in the provisions of this Contract may be submitted to the Awarding Authority by the Contractor, Designer, Project Manager, Resident Engineer or User Agency. The

request must be made in writing and in accordance with the provisions of this Contract, Laws, and the procedures of the Awarding Authority.

**B.** A Change Order may be issued by the Awarding Authority for changes in the Work within the scope of the Contract, including but not limited to, changes in: (1) the Plans and Specifications; (2) the method or manner of performance of the Work; (3) the Owner-furnished facilities, equipment, materials, services or Site; (4) the schedule for performance of the Work.

**C.** The Contractor shall immediately perform any Change Order work that is ordered by the Awarding Authority.

**D.** Whenever a Change Order is issued and said Change Order will cause a change in the Contractor's cost, the Contractor or the Awarding Authority may request an equitable adjustment in the Contract Price. A request for such an adjustment shall be in writing and shall be submitted by the party making such claim to the other party before commencement of the pertinent work or as soon thereafter as possible.

**E.** The Awarding Authority and the Contractor shall negotiate in good faith an agreement on an equitable adjustment in the Contract Price, and/or time if appropriate, before commencement of the pertinent work or as soon thereafter as is possible. In the absence of an agreement for an equitable adjustment, the Awarding Authority shall unilaterally determine the costs attributable to the change and provide the Contractor with a written notice to that effect. The Contractor may appeal the decision of the Awarding Authority within thirty days of receipt of said notice, to the chief executive official of the Awarding Authority or his designee, and the Contractor shall have the right to such further appeal as is provided in M.G.L. c.30, s. 39Q set forth in Section 4.D of this Article VII. However, if the Contractor shall exercise its rights to appeal the decision of the Awarding Authority as aforesaid, the Contractor shall be required to engage in the mandatory mediation procedures set forth in Section 5 of this Article VII.

**F.** During the negotiation of an equitable adjustment in the Contract Price, the Contractor shall, if requested, provide the Awarding Authority with all cost and pricing data used by him in computing the amount of the equitable adjustment, and the Contractor shall certify that the pricing data used was accurate, complete and current. If the Awarding Authority subsequently determines that the data submitted by the Contractor was incomplete, incorrect or not current, the Awarding Authority may exclude such data from consideration under the equitable adjustment request.

## **2. Methods of Computing Equitable Adjustments.**

**A.** Equitable adjustments in the Contract Price shall be determined according to one of the following methods, or a combination thereof, as determined by the Awarding Authority:

- (1) fixed price basis, provided that the fixed price shall be inclusive of items (a) through (e) below and shall be computed in accordance with those provisions;
- (2) estimated lump sum basis to be adjusted in accordance with Contract unit prices or other agreed upon unit prices provided that the unit prices shall be inclusive of all costs related to such equitable adjustment;
- (3) time and materials basis to be subsequently adjusted on the basis of actual costs (but subject to a predetermined "not to exceed limit") calculated as follows:
  - (a) the direct cost (or credit) for labor at the minimum wage rates established for this Contract pursuant to M.G.L. c. 149, s 26-27H, and the direct cost for material and use of equipment;
  - (b) plus (or minus) the cost of Workmen's Compensation Insurance, Liability Insurance, Federal Social Security and Massachusetts Unemployment Compensation, or as an alternative the Contractor may elect to use a flat 30% of the total labor rate computed in accordance with subparagraph (a) above;
  - (c) plus an allowance equal to 20% of the amount of (a) above for overhead, superintendence and profit; (In the case of Item 1 work, which is the work of the Contractor and all his non-filed Subcontractors, said 20% allowance shall be paid to the Contractor and the Contractor and said non-filed Subcontractors shall agree upon the distribution of this amount as a matter of contract between

them. In the case of Item 2 work, which is work performed by a Subcontractor filed pursuant to M.G.L. c. 149, s. 44F, said 20% allowance shall be paid to the filed Subcontractor, it being understood that this provision does not apply to other Subcontractors including sub-Subcontractors listed under paragraph E of the form for sub-Bid);

- (d) plus, for work performed by a Subcontractor filed pursuant to M.G.L. c. 149, s. 44F, an additional allowance equal to 7% of the sum of (a) through (c) above as full compensation to the Contractor for processing forms and assuming full responsibility for the faithful performance of such work by said filed Subcontractor(s), provided that there shall be no additional allowance to a General Contractor if the General Contractor self performs the subcontract work pursuant to M.G.L. c. 149, s. 44F(5).
- (e) plus (or minus) the actual direct additional premium costs and expenses incurred as a result of collective bargaining agreements or other agreements between organized labor and employers, and plus (or minus) the actual direct premium cost of payment and performance bonds required of Contractor and filed Subcontractors for this Contract.

(4) Contractor and Subcontractors are required to anticipate annual updated prevailing wage schedules in accordance with G.L. c149, §27 and shall not be entitled to claim additional compensation for base bid contract work due to updated prevailing wage schedules.

**B.** If the net change is an addition to the Contract Price, it shall include the Contractor's overhead, superintendence and profit. On any change that involves a net credit, no allowance for overhead, superintendence and profits shall be included. For any change that does not include labor performed or materials installed in the project, there will be no markup for the Contractor's overhead, superintendence, and profit, even though there may be a net increase in the Contract Price. Charges for small tools known as "tools of the trade" are not to be computed in the amount of any change in the Contract Price.

**C.** Statutory Contract adjustments made under the provisions of M.G.L. c. 149, s.44F shall not be considered Change Orders and shall not entitle the Contractor to any adjustments for overhead, profit, and superintendence, although the Awarding Authority may require that such Contract adjustments be processed on standard Change Order and equitable adjustment forms.

### **3. Work Performed Under Protest.**

The Contractor agrees to perform all Work as directed by the Awarding Authority, and if the Project Manager determines that certain Work that the Contractor believes to be or to warrant a Change Order under this Article does not represent a change in the Work, the Contractor shall perform said Work. The Contractor shall be deemed to have concurred with the Project Manager's determination as aforesaid unless the Contractor shall perform Work under protest in compliance with the following sub-paragraphs (1) and (2) below:

(1) If the Contractor claims compensation for a change in the Work that is not deemed by the Project Manager to be a change or to warrant additional compensation as claimed by the Contractor, the Contractor shall on or before the first working day following the commencement of any such work or the sustaining of any such damage submit to the Designer, Resident Engineer and the Awarding Authority a written statement of the nature of such work or claim.

The Contractor shall not be entitled to additional compensation for any work performed or damage sustained for which written notice is not given within the time limit specified in the preceding sentence, even though similar in character to work or damage with respect to which notice is timely given.

(2) On or before the second working day after the commencement of such work or the sustaining of such damage, and daily thereafter, the Contractor shall file to the extent possible with the Resident Engineer, the Designer, and the Awarding Authority, itemized statements of the details and costs of such work performed or damage sustained. The Contractor shall use the DCAMM Daily

Time and Materials Report found in DCAMM Form 13 to record all labor and material used. If the Contractor shall fail to make such statements to the extent possible, then the Contractor shall not be entitled to additional compensation for any such work or damages.

**4. False Claims, Statutory Provisions Regarding Changes.**

**A. Criminal Penalties:** The Contractor's attention is directed to M.G.L. c. 30, s. 39I which provides criminal penalties for unauthorized deviations from the Plans and Specifications, and to M.G.L. c. 30, s. 39J and M.G.L. c. 7, s. 42E-42I. The Contractor's attention is also directed to M.G.L. 266, s. 67B which provides criminal penalties for false claims by Contractor under this Contract:

*"Whoever makes or presents to any employee, department, agency or public instrumentality of the commonwealth, or of any political subdivision thereof, any claim upon or against any department, agency, or public instrumentality of the commonwealth, or any political subdivision thereof, knowing such claim to be false, fictitious, or fraudulent, shall be punished by a fine of not more than ten thousand dollars or by imprisonment in the state prison for not more than five years, or in the house of correction for not more than two and one-half years, or both."*

**B. Differing Site Conditions (M.G.L. c. 30, s. 39N):** *"If, during the progress of the work, the contractor or the awarding authority discovers that the actual subsurface or latent physical conditions encountered at the Site differ substantially or materially from those shown on the plans or indicated in the contract documents either the contractor or the contracting authority may request an equitable adjustment in the contract price of the contract applying to work affected by the differing Site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a contractor, or upon its own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the contract documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the plans and contract documents and are of such a nature as to cause an increase or decrease in the cost of performance of the work or a change in the construction methods required for the performance of the work which results in an increase or decrease in the cost of the work, the contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly."*

**C. Timely Decision By Awarding Authority( M.G.L. c. 30, s. 39P):** *"Every contract subject to section thirty-nine M of this chapter or section forty-four A of chapter one hundred forty-nine which requires the awarding authority, any official, its architect or engineer to make a decision on interpretation of the specifications, approval of equipment, material or any other approval, or progress of the work, shall require that the decision be made promptly and, in any event, no later than thirty days after the written submission for decision; but if such decision requires extended investigation and study, the awarding authority, the official, architect or engineer shall, within thirty days after the receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty day period and the date by which the decision will be made."*

**D. Change Order / Contract Interpretation Appeal Procedure (M.G.L. c. 30, s. 39Q):** The following provisions apply to every contract awarded by any state agency as defined by M.G.L. c. 7, s. 39A for the construction, reconstruction, alteration, remodeling, repair or demolition of any capital facility as defined by the aforesaid section 39A:

*"(a) Disputes regarding changes in and interpretations of the terms or scope of the contract and denials of or failures to act upon claims for payment for extra work or materials shall be resolved according to the following procedures, which shall constitute the exclusive method for resolving such disputes. Written notice of the*

*matter in dispute shall be submitted promptly by the claimant to the chief executive official of the state agency which awarded the contract or his designee. No person or business entity having a contract with a state agency shall delay, suspend, or curtail performance under that contract as a result of any dispute subject to this section. Any disputed order, decision or action by the agency or its authorized representative shall be fully performed or complied with pending resolution of the dispute.*

*"(b) Within thirty days of submission of the dispute to the chief executive official of the state agency or his designee, he shall issue a written decision stating the reasons therefore, and shall notify the parties of their right of appeal under this section. If the official or his designee is unable to issue a decision within thirty days, he shall notify the parties to the dispute in writing of the reasons why a decision cannot be issued within thirty days and of the date by which the decision shall issue. Failure to issue a decision within the thirty-day period or within the additional time period specified in such written notice shall be deemed to constitute a denial of the claim and shall authorize resort to the appeal procedure described below. The decision of the chief executive official or his/her designee shall be final and conclusive unless an appeal is taken as provided below.*

*"(c) Within twenty-one calendar days of the receipt of a written decision or of the failure to issue a decision as stated in the preceding subparagraph, any aggrieved party may file a notice of claim for an adjudicatory hearing with the division of hearing officers or the aggrieved party may file an action directly in a court of competent jurisdiction and shall serve copies thereof upon all other parties in the form and manner prescribed by the rules governing the conduct of adjudicatory proceedings of the division of hearing officers. In the event an aggrieved party exercises his option to file an action directly in court as provided in the previous sentence, the twenty-one day period shall not apply to such filing and the period of filing such action shall be the same period otherwise applicable for filing a civil action in superior court. The appeal shall be referred to a hearing officer experienced in construction law and shall be prosecuted in accordance with the formal rules of procedure for the conduct of adjudicatory hearings of the division of hearing officers, except as provided below. The hearing officer shall issue a final decision as expeditiously as possible, but in no event more than one hundred and twenty calendar days after conclusion of the adjudicatory hearing, unless the decision is delayed by a request for extension of time for filing post-hearing briefs or other submissions assented to by all parties. Whenever, because an extension of time has been granted, the hearing officer is unable to issue a decision within one hundred and twenty days, s/he shall notify all parties of the reasons for the delay and the date when the decision will issue. Failure to issue a decision within the one hundred and twenty-day period or within the additional period specified in such written notice shall give the petitioner the right to pursue any legal remedies available to him without further delay.*

*"(d) When the amount in dispute is less than ten thousand dollars, a contractor who is party to the dispute may elect to submit the appeal to a hearing officer experienced in construction law for expedited hearing in accordance with the informal rules of practice and procedure of the division of hearing officers. An expedited hearing under this subparagraph shall be available at the sole option of the contractor. The hearing officer shall issue a decision no later than sixty days following the conclusion of any hearing conducted pursuant to this subparagraph. The hearing officer's decision shall be final and conclusive, and shall not be set aside except in cases of fraud."*

## **5. Mandatory Mediation.**

In the case of every dispute where the dollar amount in dispute (or the estimated dollar value of the extension of time in dispute) is \$50,000 or more and the Contractor appeals the decision of the chief executive officer of the Awarding Authority or his designee described in Section 4.B above, the Awarding Authority and the Contractor shall engage in good faith in a non-binding mediation process, which process shall be concluded within sixty days from the date that the Contractor files an appeal from said decision as provided in Section 4.B above. In the case of such disputes where the dollar amount in dispute (or the estimated dollar value of the extension of time in

dispute) is \$500,000 or more, the parties shall, if the mediation process fails, submit the dispute to a third-party Neutral or Dispute Review Board which shall within sixty days render a non-binding advisory opinion. Unless the parties have previously agreed in writing to a process for submitting disputes to mediation or a Dispute Review Board, the Awarding Authority shall determine in its reasonable discretion the procedures to be followed and shall give the Contractor notice of the same in writing within 7 days of the date that the Awarding Authority receives notice of the Contractor's appeal from the decision of the chief executive officer of the Awarding Authority or his designee. The cost of the services of any mediator selected by one party to this Contract shall be borne by the party making the selection. The cost of the services of any mediator selected jointly by the parties to this Contract or jointly by mediators selected by the parties to this Contract shall be borne equally by the Contractor and the Awarding Authority.

## **ARTICLE VIII: PAYMENT PROVISIONS**

### **1. Schedule of Values.**

Before the first application for payment the Contractor shall submit to the Designer and the Awarding Authority a schedule of values allocated to various portions of the Work in sufficient detail to reflect the various major components of each trade (with filed Subcontractors as well as MBE/WBE noted), including quantities when requested, aggregating the total Contract Price and divided so as to facilitate payments for work under each section of the Specifications. The schedule shall be prepared in such form and supported by such data to substantiate its accuracy as the Designer or the Awarding Authority may require. Each item in the schedule shall include its proper share of overhead and profit. When Approved by the Designer and the Awarding Authority, it shall constitute the Schedule of Values and shall be used only as a basis for the Contractor's requests for payments.

### **2. Payment Liabilities of Contractor.**

**A.** The Contractor shall pay to the Owner all expenses, losses and damages, as determined by the Awarding Authority or the Designer, incurred in consequence of any default, defect, omission or mistake of the Contractor or his employees or Subcontractors or the making good thereof.

**B.** If the Work (or a portion thereof) is not completed to Substantial Completion and the Contractor has not satisfied the requirements for the issuance of a Certificate of Agency Use and Occupancy by the date specified in Article 4 of the Owner - Contractor Agreement, the Contractor shall pay to the Owner liquidated damages as provided in Article VI, Section 2 of these General Conditions of the Contract.

### **3. Retention of Moneys by Awarding Authority.**

**A.** The Awarding Authority may keep any moneys which would otherwise be payable at any time hereunder, and apply the same, or so much as may be necessary therefor, to (1) the Owner 's expenditures for the Contractor's account, (2) to secure the Awarding Authority's remedies against the Contractor for the Contractor's breach of its obligations under this Contract or the breach of any person performing any part of the Work and (3) the payment of any expenses, losses or damages incurred by the Awarding Authority or any agency of the Commonwealth as a result of the failure of the Contractor to perform its obligations hereunder. The Awarding Authority may retain, until all claims are settled, such moneys as the Awarding Authority estimates to be the fair value of the Awarding Authority's claims against the Contractor, and of all claims for labor performed or furnished and for materials used or employed in or in connection with the Work and for the rental of vehicles, appliances and equipment employed and for the employment of substitute contractors and labor in connection with the Work filed in accordance with M.G.L. c. 30, s. 39A and s. 39F. The Awarding Authority may make such settlements and apply thereto any moneys retained under this Contract.

**B.** The Contractor shall each week examine all claims so filed, and if the same are in any respect incorrect or do not correctly show the amount due from the Contractor to the claimant for such labor and materials, the Contractor shall forthwith file with the Awarding Authority a separate written statement of all inaccuracies in each claim and of the correct amount due from the Contractor to each claimant therefor, and shall immediately file a statement of all payments thereafter made to such claimants. Each such statement shall be sworn to and contain a detailed breakdown required by M.G.L. c. 30 s. 39F (d) and (e). Unless such statements are so filed by the Contractor the amount shown by the claims filed shall at the option of the Awarding Authority be conclusively deemed to be the accurate amount due from the Contractor therefor in all accounting with the Awarding Authority. If the moneys retained under this Contract are insufficient to pay the sums found by the Awarding Authority to be due under the claims for labor and materials filed as aforesaid, the Awarding Authority may, at its discretion, pay the same, and the Contractor shall repay to the Awarding Authority all sums paid out. The Awarding Authority may also at its discretion use any moneys retained, due or to become due under this Contract, for the purpose of paying for both labor and materials used or employed in the Work for which claims have not been filed with the Awarding Authority.

**C.** No moneys retained under the provisions of this Article shall be held to be statutory security for the payment of claims filed in accordance with the provisions of M.G.L. c. 149, s. 29, as amended, for which security is provided by bond.

#### **4. Applications for Payment.**

**A.** The Contractor shall, once in each month on the day of the month corresponding to the day of the month specified in the Notice to Proceed referenced in Article 4 of the Owner - Contractor Agreement, on forms provided and in the manner prescribed by the Awarding Authority, submit to the Awarding Authority a statement showing the total amount of Work done to the time of such estimate and the value thereof as approved by the Resident Engineer and the Designer. It shall be the sole responsibility of the Contractor to deliver or cause to be delivered to the Resident Engineer (the "designee" as provided by M.G.L. c. 30, s. 39K), said periodic estimate in proper form, approved as provided above and arithmetically correct. All periodic estimates shall contain such certifications and other evidence supporting the Contractor's right to payment as the Awarding Authority may require, including without limitation, lien waivers and other evidence, on such forms as the Awarding Authority may require, establishing that title to the equipment or materials is unencumbered and has been transferred to the Owner. If there is no Resident Engineer assigned to the Contract, the Designer shall be the designee. If there is neither a Resident Engineer nor a Designer the designee shall be a person designated by the Awarding Authority at the project field office or alternatively the home office of the Awarding Authority. The Contractor shall include in such periodic estimate only such materials as are incorporated in the Work, except as provided in paragraph C below. The Awarding Authority shall retain five percent of such estimated value as part security for the completion of the Work and shall pay to the Contractor while carrying on the Work the balance not retained as aforesaid, subject to the Approval of the Awarding Authority after deducting therefrom all previous payments and all sums to be kept under the provisions of this Contract.

**B.** Each periodic estimate shall constitute the Contractor's representation that (1) the payment then requested to be disbursed has been incurred by the Contractor on account of the Work and is justly due to Subcontractors or, to the Contractor in the case of other Work performed by the Contractor on account thereof, (2) the materials, supplies and equipment for which Application for Payment is being submitted have been installed or incorporated into the Work or have been stored at the Site or at such off Site storage locations as the Awarding Authority shall have Approved, (3) the materials, supplies and equipment are insured in accordance with the provisions of this Contract, (4) the materials, supplies and equipment are owned by the Owner and are not subject to any liens or encumbrances, (5) the Work which is the subject of such periodic estimate has been performed in accordance with the Contract Documents and (6) that all due and



payable bills with respect to the Work have been paid to date or shall be paid from the proceeds of such periodic estimate. The Contractor's attention is directed to the criminal penalties for false claims referenced in paragraph A above.

**C.** The Contractor may include in a periodic estimate the value of materials or equipment delivered at the Site (or at some location agreed to in writing) only upon delivery to the Awarding Authority of: (1) an acceptable transfer of title on the form provided by the Awarding Authority; (2) written certification by the Contractor (or applicable subcontractor) on the form provided by the Awarding Authority that the Contractor (or the Subcontractor which executed the transfer of title) is the lawful owner and that the materials or equipment are free from all encumbrances, accompanied by receipted invoices or other acceptable proof of prior payment for such materials; (3) a stored materials insurance binder that covers the materials for which payment is requested, that names the Owner as an insured party should the stored materials be subjected to any casualty, loss, or theft prior to their inclusion in the Work. The material(s) or equipment must, in the judgment of the Designer (1) meet the requirements of the Contract, including prior shop drawing, product data, and sample approval, (2) be ready for use, and (3) be properly stored by the Contractor and be adequately protected until incorporated into the Work. See also Article V.5.C of these General Conditions of the Contract concerning the cost of inspections.

**D.** The Awarding Authority may make changes in any periodic estimate submitted by the Contractor in accordance with M.G.L. c.30, s. 39K (see below) and the payment due shall be computed in accordance with the changes so made. The provisions of said section 39K shall govern payments on which the Awarding Authority has made changes.

**E.** No certificate for payment and no progress payment shall constitute acceptance of Work that is not in accordance with the Contract Documents.

**F.** The Contractor and all Subcontractors furnishing labor on this Contract agree to furnish certified payroll reports if requested to do so, at no additional expense to the Awarding Authority. The Awarding Authority may at all reasonable times audit such reports.

#### **5. Periodic Payments ( M.G. L. c. 30, s. 39K).**

The Awarding Authority shall make payment to the Contractor in accordance with M.G.L. c. 30, s. 39K, which provides as follows:

*"Within fifteen days (30 days in the case of the commonwealth, including local housing authorities) after receipt from the contractor, at the place designated by the awarding authority if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the awarding authority will make a periodic payment to the contractor for the work performed during the preceding month and for the materials not incorporated in the work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the contractor has title or to which a subcontractor has title and has authorized the contractor to transfer title to the awarding authority upon certification by the contractor that he is the lawful owner and that the materials are free from all encumbrances, but less (1) a retention based on its estimate of the fair value of its claims against the contractor and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, and less (3) a retention not exceeding five percent of the approved amount of the periodic payment. After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the contractor fully completes the work or substantially completes the work so that the value of the work remaining to be done is, in the estimate of the awarding authority, less than one percent of the original contract price, or (b) the contractor substantially completes the work and the awarding authority takes possession for occupancy, whichever occurs first, the awarding authority shall pay the contractor the entire balance due on the Contract less (1) a retention based on its estimate of the fair value of its claims against the contractor and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, or based on the record of payments by the*

*contractor to the subcontractors under this contract if such record of payment indicates that the contractor has not paid subcontractors as provided in section thirty-nine F. If the awarding authority fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the contractor; provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for final payment until fifteen days (twenty-four days in the case of the commonwealth) after receipt of such period estimate from the contractor, at the place designated by the awarding authority if such a place is so designated. The contractor agrees to pay to each subcontractor a portion of any such interest paid in accordance with the amount due each subcontractor.*

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

*All periodic estimates shall be submitted to the awarding authority, or to its designee as set forth in writing to the contractor, and the date of receipt by the awarding authority or its designee shall be marked on the estimate. All periodic estimates shall contain a separate item for each filed subtrade and each sub-subtrade listed in sub-bid form as required by specifications and column listing the amount paid to each filed subcontractor as of the date of the periodic estimate is filed. The person making payment for the awarding authority shall add the daily interest provided for herein to each payment for each day beyond the due date of receipt marked on the estimate.*

*A certificate of the architect to the effect that the contractor has fully or substantially completed the work shall, subject to the provisions of section thirty-nine J, be conclusive for the purposes of this section.*

*Notwithstanding the provisions of this section, at any time after the value of the work remaining to be done is, in the estimation of the awarding authority, less than 1 per cent of the adjusted contract price, or the awarding authority has determined that the contractor has substantially completed the work and the awarding authority has taken possession for occupancy, the awarding authority may send to the general contractor by certified mail, return receipt requested, a complete and final list of all incomplete and unsatisfactory work items, including, for each item on the list, a good faith estimate of the fair and reasonable cost of completing such item. The general contractor shall then complete all such work items within 30 days of receipt of such list or before the contract completion date, whichever is later. If the general contractor fails to complete all incomplete and unsatisfactory work items within 45 days after receipt of such items furnished by the awarding authority or before the contract completion date, whichever is later, subsequent to an additional 14 days' written notice to the general contractor by certified mail, return receipt requested, the awarding authority may terminate the contract and complete the incomplete and*

*unsatisfactory work items and charge the cost of same to the general contractor and such termination shall be without prejudice to any other rights or remedies the awarding authority may have under the contract. The awarding authority shall note any such termination in the evaluation form to be filed by the awarding authority pursuant to the provisions of section 44D of chapter 149."*

**6. Payment of Subcontractors (M.G.L. c. 30, s. 39F).**

The Contractor shall make payments to Subcontractors in accordance with M.G.L. c. 30, s. 39F which is quoted in this section below. For the purposes of this Contract, the word "forthwith" appearing in paragraph (1)(a) of the quoted provision shall be deemed to mean "within five (5) business days."

*"1(a) Forthwith after the general contractor receives payment on account of a periodic estimate, the general Contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.*

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

*(c) Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor; and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (1) and (2) the awarding authority shall act upon the demand as provided in this section.*

*(d) If, within seventy days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the subcontractor may demand direct payment of that balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the subcontractor has substantially completed the subcontract work. Within ten days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.*

*(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided that the awarding authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the subcontractor forthwith after the removal of the basis for deduction from direct payments made as provided in parts (i) and (ii) of this subparagraph.*

*(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (5) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general contractor and the subcontractor or as determined by decree of a court of competent jurisdiction.*

*(g) All direct payments and all deductions from demands for direct payments deposited in an interest bearing account or accounts in a bank pursuant to subparagraph (6) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the General contractor and in the order of receipt of such demands from subcontractors. All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of such payment.*

*(h) The awarding authority shall deduct from payments to a General contractor amounts which, together with the deposits in interest bearing accounts pursuant to subparagraph (6) are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor.*

*(i) If the subcontractor does not receive payment as provided in subparagraph (1) or if the general contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the subcontractor and the subcontractor does not receive payment for same when due less the deductions provided for in subparagraph (1), the subcontractor may demand direct payment by following the procedure in subparagraph (4) and the general contractor may file a sworn reply as provided in that same subparagraph. A demand made after the first day of the month following that for which the subcontractor performed or furnished the labor and materials for which the subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the general contractor. Thereafter the awarding authority shall proceed as provided in subparagraph (e), (f), (g) and (h)."*

*(2) Any assignment by a subcontractor of the rights under this section to a surety company furnishing a bond under the provisions of section twenty-nine of chapter one hundred forty-nine shall be invalid. The assignment and subrogation rights of the surety to amounts included in a demand for direct payment which are in the possession of the awarding authority or which are on deposit pursuant to subparagraph (6) shall be subordinate to the rights of all subcontractors who are entitled to be paid under this section and who have not been paid in full.*

*(3) "subcontractor" as used in this section (I) for contracts awarded as provided in sections forty-four A to forty-four L, inclusive, of chapter one hundred forty-nine shall*

*mean a person who files a sub-bid and received a subcontract as a result of that filed sub-bid or who is approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, (ii) for contracts awarded as provided in paragraph (1) of section thirty-nine M of chapter thirty shall mean a person approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, and (iii) for contracts with the commonwealth not awarded as provided in sections forty-four A to forty-four L, inclusive, of chapter one hundred forty-nine shall also mean a person contracting with the general contractor to supply materials used or employed in a public works project for a price in excess of five thousand dollars.*

*(4) A general contractor or a subcontractor shall enforce a claim to any portion of the amount of a demand for direct payment deposit as provided in subparagraph (6) by a petition in equity in the superior court against the other and the bank shall not be a necessary party. A subcontractor shall enforce a claim for direct payment or a right to require a deposit as provided in subparagraph (6) by a petition in equity in the superior court against the awarding authority and the general contractor shall not be a necessary party. Upon motion of any party the court shall advance for speedy trial any petition filed as provided in this paragraph. Sections fifty-nine and fifty-nine B of chapter two hundred thirty-one shall apply to such petitions. The court shall enter an interlocutory decree upon which execution shall issue for any part of a claim found due pursuant to sections fifty-nine and fifty-nine B and, upon motion of any party, shall advance for speedy trial the petition to collect the remainder of the claim. Any party aggrieved by such interlocutory decree shall have the right to appeal therefrom as from a final decree. The court shall not consolidate for trial the petition of any subcontractor with the petition of one or more subcontractors or the same general Contract unless the court finds that a substantial portion of the evidence of the same events during the course of construction (other than the fact that the claims sought to be consolidated arise under the same general contract) is applicable to the petitions sought to be consolidated and that such consolidation will prevent unnecessary duplication of evidence. A decree in any such proceeding shall not include interest on the disputed amount deposited in excess of the interest earned for the period of any such deposit. No person except a subcontractor filing a demand for direct payment for which no funds due the general contractor are available for direct payment shall have a right to file a petition in court of equity against the awarding authority claiming a demand for direct payment is premature and such subcontractor must file the petition before the awarding authority has made a direct payment to the subcontractor and has made a deposit of the disputed portion as provided in part (iii) of subparagraph (5) and in subparagraph (6).*

*(5) In any petition to collect any claim for which a subcontractor has filed a demand for direct payment the court shall, upon motion of the general contractor, reduce by the amount of any deposit of a disputed amount by the awarding authority as provided in part (iii) of subparagraph (5) and in subparagraph (6) any amount held under a trustee writ or pursuant to a restraining order or injunction.”*

**7. Contracts for Public Works Governed by M.G.L. c. 30, s. 39G:**

The following statutory provision applies only to contracts for public works governed by M.G.L. c. 30, s. 39G: *"Upon substantial completion of the work required by a Contract with the Owner, or any agency or political subdivision thereof, for the construction, reconstruction, alteration, remodeling, repair or improvement of public ways, including bridges, and other highway structures, sewers and water mains, airports and other public works, the contractor shall present in writing to the awarding authority its certification that the work has been substantially completed. Within twenty-one days thereafter, the awarding authority shall present to the contractor either a written declaration that the work has been substantially completed or an itemized list of incomplete or unsatisfactory work items required by the Contract sufficient to demonstrate that the work has not been substantially completed. The awarding authority may include with such a list a notice setting forth a reasonable*

*time, which shall not in any event be prior to the Contract completion date, within which the contractor must achieve substantial completion of the work. In the event that the awarding authority fails to respond, by presentation of a written declaration or itemized list as aforesaid, to the contractor's certification within the twenty-one day period, the contractor's certification shall take effect as the awarding authority's declaration that the work has been substantially completed.*

*Within sixty-five days after the effective date of a declaration of a substantial completion, the awarding authority shall prepare and forthwith send to the contractor for acceptance a substantial completion estimate for the quantity and price of the work done and all but one percent retainage of that undisputed part of each work item and extra work item in dispute but excluding the disputed part thereof, less the estimated cost of completing all incomplete and unsatisfactory work items and less the total periodic payments made to date for the work. The awarding authority also shall deduct from the substantial completion estimate an amount equal to the sum of all demands for direct payments filed by subcontractors and not yet paid to subcontractors or deposited in joint accounts pursuant to section thirty-nine F, but no Contract subject to said section thirty-nine F shall contain any other provision authorizing the awarding authority to deduct any amount by virtue of claims asserted against the Contract by subcontractors, material suppliers or others.*

*If the awarding authority fails to prepare and send to the contractor any substantial completion estimate required by this section on or before the date herein above set forth, the awarding authority shall pay to the contractor interest on the amount which would have been due to the contractor pursuant to such substantial completion estimate at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston from such date to the date on which the awarding authority sends that substantial completion estimate to the contractor for acceptance or to the date of payment therefor, whichever occurs first. The awarding authority shall include the amount of such interest in the substantial completion estimate.*

*Within fifteen days after the effective date of the declaration of substantial completion, the awarding authority shall send to the contractor by certified mail, return receipt requested, a complete list of all incomplete or unsatisfactory work items, and, unless delayed by causes beyond his control, the contractor shall complete all such work items within forty-five days after the receipt of such list or before the then Contract completion date, whichever is later. If the contractor fails to complete such work within such time, the awarding authority may, subsequent to seven days' written notice to the contractor by certified mail, return receipt requested, terminate the Contract and complete the incomplete or unsatisfactory work items and charge the cost of same to the contractor.*

*Within thirty days after receipt by the awarding authority of a notice from the contractor stating that all of the work required by the Contract has been completed, the awarding authority shall prepare and forthwith send to the contractor for acceptance a final estimate for the quantity and price of the work done and all retainage on that work less all payments made to date, unless the awarding authority's inspection shows that work items required by the Contract remain incomplete or unsatisfactory, or that documentation required by the Contract has not been completed. If the awarding authority fails to prepare and send to the contractor the final estimate within thirty days after receipt of notice of completion, the awarding authority shall pay to the contractor interest on the amount which would have been due to the contractor pursuant to such final estimate at the rate hereinabove provided from the thirtieth day after such completion until the date on which the awarding authority sends the final estimate to the contractor for acceptance or the date of payment therefore, whichever occurs first, provided that the awarding authority's inspection shows that no work items required by the Contract remain incomplete or*

*unsatisfactory. Interest shall not be paid hereunder on amounts for which interest is required to be paid in connection with the substantial completion estimate as hereinabove provided. The awarding authority shall include the amount of the interest required to be paid hereunder in the final estimate.*

*The awarding authority shall pay the amount due pursuant to any substantial completion or final estimate within thirty-five days after receipt of written acceptance for such estimate from the contractor and shall pay interest on the amount due pursuant to such estimate at the rate hereinabove provided from that thirty-fifth day to the date of payment. Within 15 days, 30 days in the case of the commonwealth, after receipt from the contractor, at the place designated by the awarding authority, if such place is designated, of a periodic estimate requesting payment of the amount due for the preceding periodic estimate period, the awarding authority shall make a periodic payment to the contractor for the work performed during the preceding periodic estimate period and for the materials not incorporated in the work but delivered and suitably stored at the Site, or at some location agreed upon in writing, to which the contractor has title or to which a subcontractor has title and authorized the contractor to transfer title to the awarding authority, upon certification by the contractor that he is the lawful owner and that the materials are free from all encumbrances. The awarding authority shall include with each such payment interest on the amount due pursuant to such periodic estimate at the rate herein above provided from the due date. In the case of periodic payments, the contracting authority may deduct from its payment a retention based on the estimate of the fair value of its claims against the contractor, a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, and a retention to secure satisfactory performance of the contractual work not exceeding five per cent of the approved amount of any periodic payment, and the same right to retention shall apply to bonded subcontractors entitled to direct payment under section thirty-nine F of chapter thirty; provided that a five per cent value of all items that are planted in the ground shall be deducted from the periodic payments until final acceptance.*

*No periodic, substantial completion or final estimate or acceptance or payment thereof shall bar a contractor from reserving all rights to dispute the quantity and amount of, or the failure of the awarding authority to approve a quantity and amount of, all or part of any work item or extra work item.*

*Substantial completion, for the purposes of this section, shall mean either that the work required by the Contract has been completed except for work having a Contract Price of less than one percent of the then adjusted total Contract Price, or substantially all of the work has been completed and opened to public use except for minor incomplete or unsatisfactory work items that do not materially impair the usefulness of the work required by the contract”*

**8. Final Payment; Release of Claims by Contractor.**

Upon Final Acceptance of the Work the Contractor shall be entitled to payment of the balance of the Contract Price. Final payment shall be as provided in this Article above and in accordance with any process set forth in the *Supplementary General Conditions*. The Contractor agrees to execute a Certificate of Final Inspection, Release (with Contractor's own exceptions listed thereon) and Acceptance as a condition precedent to Final Payment. The acceptance by the Contractor of the Final Payment made as aforesaid, or the execution of the Certificate of Final Acceptance by the Contractor, shall constitute a release of the Owner, the Awarding Authority, the Designer, and every member and agent of any of them, from all claims of and liability to the Contractor for anything done or furnished for or relating to the Work, or for any act or neglect of the Owner, the Designer, or of any person relating to or affecting the Work, except the claim against the Owner or the Designer for the remainder, if any there be, of the amounts set forth by the Contractor in the Certificate of Final

Inspection, Release and Acceptance. Final Acceptance shall not relieve Contractor of the requirements of Articles IX, XIV, and XV of these General Conditions of the Contract, or of other provisions of this Contract, to the extent that the same are intended to survive Final Acceptance.

## **ARTICLE IX. GUARANTEES AND WARRANTIES**

### **1. General Warranty.**

If at any time during the period of one (1) year from the date of the issuance of the Certificate of Agency Use and Occupancy by the Awarding Authority or the date of Final Acceptance, whichever occurs first, any part of such Work shall in the reasonable opinion of the Awarding Authority be defective or require replacing or repairing, or damage to other property of the Owner is caused by any defect in the Work, the Awarding Authority shall notify the Contractor in writing to make the required repairs or replacements and repair such damage. If the Contractor shall neglect to commence such repairs or replacements to the satisfaction to the Awarding Authority within ten (10) days from the date of the giving of such notice, then the Awarding Authority may employ other persons to make the same. The Contractor agrees, upon demand, to pay to the Awarding Authority all amounts which it expends for such repairs, replacements, and/or damages. During this one-year guarantee period any corrective work shall be performed under all the applicable terms of this Contract, and if Change Orders are issued in accordance with the terms of this Contract, the Contractor shall be entitled to compensation for special insurance, as required. This one-year guarantee shall not limit any express guaranty or warranty provided elsewhere in the Contract.

### **2. Special Guarantees and Warrantees.**

**A.** The Contractor's obligation to correct Work as set forth in paragraph 1 above is in addition to, and not in substitution of, such guarantees or warranties as may be required in the various sections of the Specifications.

**B.** Guarantees and warranties required in the various sections of the Specifications must be delivered to the Designer before final payment to the Contractor may be made, or in the case of guarantees and warranties which originate with a subcontractor's section of the Work, before final payment for the amount of that subtrade or for the phase of Work to which the guarantee or warranty relates.

**C.** The failure to deliver a required guarantee or warranty shall constitute a failure to fully complete the Work in accordance with the Contract Documents.

## **ARTICLE X: MISCELLANEOUS LEGAL REQUIREMENTS.**

### **1. Contractor to be Informed.**

The Contractor shall inform itself of all existing and future Laws in any manner affecting those engaged or employed in the Work, or the materials used or employed in the Work, or in any way affecting the conduct of the Work, and of all orders and decrees of bodies or tribunals having any applicable jurisdiction or authority over the Work.

### **2. Compliance with all Laws.**

The Contractor shall cause all persons employed in the performance of the Work to comply with, all existing and future Laws, including but not limited to those set forth below:

**A. Corporate Disclosures.** The Contractor, if a foreign corporation, shall comply with M.G.L. c. 181, s.3 and s. 5, and M.G.L. c. 30, s.39L.

**A ½. Workforce Certification: Certification of Compliance with Workforce Related Legal Requirements.** The Contractor shall comply with the following legal



requirements for any and all employees to be employed in the Project who are required to be listed in the certified payroll reports for the Project: 1) Federal Department of Homeland Security Requirements in hiring such employees including, but not limited to, the faithful completion of the Federal Department of Homeland Security Form I-9 process by CM; 2) proper classification of individuals employed on the project; 3) all laws concerning workers' compensation insurance coverage, unemployment insurance, social security taxes, and income taxes; and 4) all laws concerning hospitalization and medical benefits that meet the minimum requirements of the Connector Board established in Chapter 176Q of the General Laws. The Contractor shall execute a Workforce Certification form with the execution of its contract. The Contractor shall require each Subcontractor and sub subcontractor working on the Project to execute and provide to Contractor such Workforce Certification form with the execution of each subcontract, and Contractor shall immediately provide a copy to DCAMM. Contractor acknowledges that with the weekly workforce reports that must be submitted on a weekly basis, in the form and format required by DCAMM, including but not limited to, by electronic reporting, Contractor and all subcontractors on the project are required to certify that the Form I-9 process was faithfully completed and that all other legal requirements related to its workforce referenced above were followed for all employees listed on each certified payroll report when submitted. The Contractor and all subcontractors must: comply with the legal requirements of this section; must not knowingly use undocumented workers in connection with the performance of this contract; pursuant to federal requirements must verify the immigration status of all workers assigned to the contract without engaging in unlawful discrimination; and must not knowingly or recklessly alter, falsify, or accept altered or falsified documents from any such worker. Breach of any of the terms of the Workforce Certification legal requirements during the period of the Contract may be regarded as a material breach, subjecting the Contractor and subcontractors to sanctions, including but not limited to monetary penalties, withholding of payments, contract suspension or termination. Contractor must require each subcontractor working on the Project to execute and provide to Contractor a Workforce Certification form with the execution of each subcontract, and Contractor must require each subcontractor to forward a copy of each such Workforce Certification to the Contractor for filing with DCAMM.

**B. Veterans Preference.** In the employment of mechanics and apprentices, teamsters, chauffeurs, and laborers in the performance of Work in the Commonwealth, preference shall first be given to citizens of the Commonwealth who have been residents of the Commonwealth for at least six months at the commencement of their employment and who are veterans as defined in M.G.L. c.4, s.7 (34), and who are qualified to perform the work to which the employment relates and, within such preference, preference shall be given to service-disabled veterans; and secondly, to citizens of the Commonwealth generally who have been residents of the Commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers, then to citizens of the United States.

The Awarding Authority encourages the participation of Service-Disabled Veteran-Owned Business Enterprises ("SDVOBE") in its construction and design projects pursuant to Chapter 108 of the Acts of 2012 and Executive Order 546. The benchmark for SDVOBE participation on the Project is 3% of the Contract Price. A SDVOBE for purposes of the Commonwealth's program, is a Service-Disabled Veteran-Owned Small Business ("SDVOSB") as designated by the federal government pursuant to 15 USC §632, whose status as a SDVOSB can be verified on the U.S. VetBiz Vendor Information Page located at [www.VetBiz.gov](http://www.VetBiz.gov). SDVOBE's shall be provided opportunities to participate in the Project and Contractor shall within 30 days of contract execution submit its Anticipated Service-Disabled Veteran-Owned Business Enterprise Participation plan to the Awarding Authority's Compliance Office. Contractor shall report on the amount of

SDVOBE participation on the Project on a regular basis, in the form, format and frequency requested by the Awarding Authority, including, but not limited to, by electronic reporting.

**C. Prevailing Wages.** The Contractor shall comply with M.G.L. c. 149, s. 26-27H. The prevailing wage schedule is found in Exhibit A to the Instructions to Bidders, listing the prevailing minimum wage rates that must be paid to all workers employed in the Work. The Awarding Authority is not responsible for any errors, omissions, or misprints in the said schedule. Such Schedule shall continue to be the minimum rate wages payable to workers employed in the Work throughout the term of this Contract, subject to the exceptions provided in M.G.L. c.149, s. 26-27H. The Contractor shall not have any claim for extra compensation from the Owner if the actual wages paid to workers employed in the Work exceeds the rates listed on the schedule or as otherwise provided by law. The Contractor shall cause a copy of said Schedule to be kept in a conspicuous place at the Site during the term of the Contract. If reserve police officers are employed by the Contractor, they shall be paid the prevailing wage of regular police officers. (See M.G.L. c.149, s.34B). Mass General Laws c. 149, §27, as amended on August 8, 2008 requires annual updates to prevailing wage schedules for all public construction projects lasting longer than one year. The Contractor is required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The Contractor and all Subcontractors are required to anticipate such annual updated prevailing wage schedules and neither the Contractor nor any Subcontractors shall be entitled to claim additional compensation for base contract work due to updated prevailing wage schedules.

**D. Payroll Records and Statement of Compliance.** The Contractor shall comply and shall cause its Subcontractors to comply with Massachusetts General Law c. 149, s. 27B, which requires that a true and accurate record be kept of all persons employed on the a project for which the prevailing wage rates have been provided. The Contractor and all Subcontractors shall keep these records and preserve them for a period of three years from the date of completion of the Contract. Such records shall be open to inspection by any authorized representative of the Owner at any reasonable time, and as often as may be necessary. The Contractor shall, and shall cause its subcontractors to, submit weekly copies of their weekly payroll records to the Awarding Authority. In addition, the Contractor and each Subcontractor shall furnish to the Executive Department of Labor within fifteen days after completion of its portion of the Work a signed statement in the form required by the Awarding Authority.

**E. Vehicle operators.** If the Director of the Department of Labor and Workforce Development has established a Schedule of wage rates to be paid to the operators of trucks, vehicles or equipment for the Work, the Contractor shall be obligated to pay such operators at least the minimum wage rate contained on such Schedule. (See M.G.L. c.149, s.26-27H).

**F. Eight Hour Day.** The Contractor shall comply with M.G.L. c. 149, s. 30, 34 and 34A which provide that no laborer, workman, mechanic, foreman or inspector working within the Commonwealth in the employ of the Contractor, subcontractor or other person doing or contracting to do the whole or part of the Work shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of extraordinary emergency.

**G. Timely Payment of Wages.** The Contractor shall comply with, and shall cause its Subcontractors to comply with M.G.L. c. 149, s. 148 which requires the weekly or biweekly payment of employees within six days of the end of the pay period during which wages were earned if employed for five or six days of a calendar week, and within other periods of time under certain circumstances as set forth therein.

**H. Lodging, etc.** The Contractor shall comply with, and shall cause its Subcontractors to comply with, M.G.L. c. 149, s. 25 which provides that every employee under this Contract shall lodge, board and trade where and with whom he elects, and neither the Contractor nor his agents or employees shall, either directly or

indirectly, require as a condition of the employment of any person that the employee shall lodge, board or trade at a particular place or with a particular person.

**I. Truck Rates.** The use by the Contractor of trucks or other motor vehicles hired from either common or contract motor carriers in the course of performance of this Contract is subject to such minimum rates and charges, and rules and regulations as may from time to time be promulgated by the Department of Public Utilities of the Commonwealth of Massachusetts or other agency of the State of Federal government which may be authorized by law to set rates or otherwise regulate the use of such vehicles. The Contractor expressly assumes the risk of any additional expense that may arise by reason of any change in such minimum rates and charges, and rules and regulations, and shall be entitled to no additional compensation or reimbursement by reason thereof.

**J. Anti-Boycott Covenant (Executive Order #130).** The Contractor warrants, represents and agrees that during the time this Contract is in effect, neither it or any affiliated company, as hereafter defined, participates in or cooperates with an international boycott, as defined in Section 999(b) (3) and (4) of the Internal Revenue Code of 1954, as amended, or engages in conduct declared to be unlawful by M.G.L. c. 151E, s. 2. If there shall be a breach in the warranty, representation or agreement contained in this paragraph, then without limiting such other rights as it may have the Awarding Authority shall be entitled to rescind this contract. As used herein, an affiliated company shall be any business entity of which at least 51% of the ownership interests are directly or indirectly owned by the Contractor or by a person or persons or business entity or entities directly or indirectly owning at least 51% of the Ownership interests of the Contractor; or which directly or indirectly owns at least 51% of the Ownership interests of the Contractor.

**K. Contractor's Agreements with Suppliers--Anti-Boycott Provisions.**

(1) The Contractor shall not purchase or rent any materials, equipment, machinery, vehicles, or supplies for or in connection with the Work from any person or entity who does not sign, under pains and penalties of perjury, a certificate that recites: "The undersigned warrants, represents and agrees that during the time its agreement with {insert contractor's name} is in effect for materials, supplies or equipment to be used in connection with the {insert the name of the Awarding Authority} Project No. {insert project number}, neither the undersigned or any affiliated company, as hereafter defined, participates in or cooperates with an international boycott, as defined in Section 999(b)(3) and (4) of the Internal Revenue Code of 1954, as amended, or engages in conduct declared to be unlawful by Section 2 of Chapter 151E of the Massachusetts General Laws. As used herein, an affiliated company shall be any business entity of which at least 51% of the ownership interests are directly or indirectly owned by the undersigned or by a person or persons or business entity or entities directly or indirectly owning at least 51% of the ownership interests of the undersigned; or which directly or indirectly owns at least 51% of the ownership interests of the undersigned."

(2) The Awarding Authority shall not be obligated to pay the Contractor for the cost of any materials, supplies, or equipment purchased or rented from any individual or entity from whom the Contractor has not previously obtained and delivered to the Awarding Authority the certificate that the previous paragraph requires. The Contractor will immediately terminate its contract with any supplier who breaches the warranty, representation and agreement contained in the previous paragraph.

(3) The Contractor shall include in the Contractor's agreement with any person or entity from whom the Contractor intends to purchase or rent any materials, equipment, machinery, vehicles or supplies for or in connection with the Work, (a) a notice that this Contract obligates the Contractor to terminate the supply contract upon discovery of such breach of the sworn certificate delivered under subparagraph (1) and such termination shall be without liability to the Contractor or the Awarding Authority and (b) a provision which states: "The Governor or his designee, the secretary of administration and finance, and the

state auditor or his designee shall have the right at reasonable times and upon reasonable notice to examine the books, records and other compilations of the undersigned vendor which pertain to the performance and requirements of this agreement to provide materials of any nature to the undersigned contractor in connection with State Project No. (insert project number)."

**L. Access to Contractor's Records (Executive Order #195).** The Governor or his designee, the secretary of administration and finance, and the state auditor or his designee shall have the right at reasonable times and upon reasonable notice to examine the books, records and other compilations of data of the Contractor which pertain to the performance and requirements of this Contract.

**M. Northern Ireland - M.G.L. c. 7 § 22C.** Pursuant to G.L. c. 7 s. 22C for state agencies, state authorities, the House of Representatives or the state Senate, the Contractor certifies that it does not employ ten or more employees in an office or other facility in Northern Ireland and if the Contractor employs ten or more employees in an office or other facility located in Northern Ireland the Contractor certifies that it does not discriminate in employment, compensation, or the terms, conditions and privileges of employment on account of religious or political belief; and it promotes religious tolerance within the work place, and the eradication of any manifestations of religious and other illegal discrimination; and the Contractor is not engaged in the manufacture, distribution or sale of firearms, munitions, including rubber or plastic bullets, tear gas, armored vehicles or military aircraft for use or deployment in any activity in Northern Ireland.

## **ARTICLE XI: CONTRACTOR'S ACCOUNTING METHOD REQUIREMENTS (M.G.L. c. 30, s. 39R)**

### **1. Definitions.**

The words defined herein shall have the meaning stated below whenever they appear in this Article XI:

--"Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a Contract pursuant to M.G.L. c. 30, s. 39M, M.G.L. c. 149, s. 44A-J, and M.G.L. c. 7, s. 30B-P.

--"Contract" means any Contract awarded or executed pursuant to M.G.L. c. 30, s. 39M, M.G.L. c. 149, s.44A-J, and M.G.L. c. 7, s. 30B-P, which is for an amount or estimated amount greater than one hundred thousand dollars.

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

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

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

or other person or persons primarily responsible for the financial and operational policies and practices of the Contractor.

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

**2. Record Keeping.**

**A.** The Contractor shall make, and keep for at least six years after final payment, books, records, and accounts that in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor.

**B.** Until the expiration of six years after final payment, the Inspector General, DCAMM, and the Awarding Authority shall have the right to examine any books, documents, papers or records of the Contractor and Subcontractors that directly pertain to, and involve transactions relating to the Contractor and Subcontractors.

**C.** The Contractor shall describe any change in the method of maintaining records or recording transactions which materially affects any statements filed with the Awarding Authority including the date of the change and reasons therefor, and shall accompany said description with a letter from the Contractor's independent certified public accountant approving or otherwise commenting on the changes.

**D.** The Contractor represents that it has, prior to the execution of the Contract, filed a statement of management on internal accounting controls as set forth in Section 3 below.

**E.** The Contractor represents that it has, prior to the execution of the Contract, filed an audited financial statement for the most recent completed fiscal year as set forth in section 4 below and will continue to file such statement annually during the term of the Contract.

**3. Statement of Management Controls.**

**A.** The Contractor shall file with the Awarding Authority a statement of management as to whether the system of internal accounting controls of the Contractor and its subsidiaries reasonably assures that:

- (1) transactions are executed in accordance with management's general and specific authorization;
- (2) transactions are recorded as necessary to: (a) to permit preparation of financial statements in conformity with generally accepted accounting principles, and (b) to maintain accountability for assets;
- (3) access to assets is permitted only in accordance with management's general or specific authorization; and
- (4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

**B.** The Contractor shall file with the Awarding Authority a statement prepared and signed by an independent certified public accountant, stating that the accountant has examined the statement of management on internal accounting controls, and expressing an opinion as to:

- (1) whether the representations of management in response to subparagraph 3 above are consistent with the results of management's evaluation of the system of internal accounting controls; and
- (2) whether such representations of management are reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statement.

**4. Annual Financial Statement.**

**A.** Every Contractor awarded a contract shall annually file with DCAMM during the term of the Contract a financial statement prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report.

**B.** The office of Inspector General and DCAMM shall have the right to enforce the provisions of this Article. A Contractor's failure to satisfy any of the requirements of this section may be grounds for debarment pursuant to M.G.L. c. 149, s. 44C.

**5. Bid Pricing Materials.**

The Contractor shall save the written calculations, pricing information, and other data that the Contractor used to calculate the bid that induced the Awarding Authority to enter into this Contract (the "Bid Pricing Materials") for at least six years after the Awarding Authority makes final payment under this Contract.

**ARTICLE XII: EQUAL EMPLOYMENT OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM.**

This Contract includes the provisions of the Awarding Authority's "Equal Employment Opportunity, Non-Discrimination, and Affirmative Action Program" attached as Appendix A to these General Conditions of the Contract and incorporated herein by reference.

**ARTICLE XIII: GOALS FOR PARTICIPATION BY MINORITY BUSINESS ENTERPRISES AND WOMEN BUSINESS ENTERPRISES**

This Contract includes the provisions of the Awarding Authority's program relating to Goals for Participation by Minority Business Enterprises and Women Business Enterprises attached as Appendix B to these General Conditions of the Contract and incorporated herein by reference.

**ARTICLE XIV: INSURANCE REQUIREMENTS**

**1. Insurance Generally.**

A. The Contractor shall purchase and maintain insurance of the type and limits listed in this Article with respect to the operations as well as the completed operations of this Contract. This insurance shall be provided at the Contractor's expense and shall be in full force and effect for the full term of the Contract or for such longer period as this Article requires.

B. All policies shall be written on an occurrence basis and be issued by companies lawfully authorized to write that type of insurance under the laws of the Commonwealth with a financial strength rating of A- or better as assigned by AM Best Company, or an equivalent rating assigned by a similar rating agency acceptable to the Awarding Authority, or otherwise acceptable to the Awarding Authority.

C. Contractor shall submit three originals of each certificate of insurance, acceptable to the Awarding Authority, simultaneously with the execution of this Contract. Certificates shall show each type of insurance, insurance company, policy number, amount of insurance, deductibles and/or self-insured retentions, and policy effective and expiration dates. Certificates shall show the Awarding Authority, the Owner and anyone else the Awarding Authority requests as an additional insured as to all policies of liability insurance. Certificates shall specifically note the following:

- that the automobile liability, umbrella liability and pollution liability policies include the Awarding Authority as an additional insured;
- that all policies include the coverage and endorsements in accordance with the terms and conditions as required by this construction contract;
- that the Builders' Risk or Installation Floater is on an all risk basis including earthquake and flood, and includes the Awarding Authority as a named insured or loss payee as their interests may appear; and
- that none of the coverages shall be cancelled, terminated, or materially modified unless and until 30 days prior notice is given in writing to the Awarding Authority.

Contractor shall submit updated certificates prior to the expiration of any of the policies referenced in the certificates so that the Awarding Authority shall at all times possess certificates indicating current coverage.

**D.** The Contractor shall file one certified complete copy of all policies and endorsements with the Awarding Authority within sixty days after Contract award. If the Awarding Authority is damaged by the Contractor's failure to maintain such insurance and to comply with the terms of this Article, then the Contractor shall be responsible for all costs and damages to the Awarding Authority attributable thereto.

**E.** Termination, cancellation, or material modification of any insurance required by this Contract, whether by the insurer or the insured, shall not be valid unless written notice thereof is given to the Awarding Authority at least thirty days prior to the effective date thereof, which shall be expressed in said notice.

**F.** The Contractor is responsible for the payment of any and all deductibles under all of the insurance required below. The Awarding Authority shall not in any instance be responsible for the payment of deductibles, self-insured retentions, or any portion thereof.

## **2. Contractor's Commercial General Liability.**

**A.** The Contractor shall purchase and maintain general liability coverage on the ISO form CG 00 01 or equivalent, including products and completed operations, on an occurrence basis. The form must be amended to state that the aggregate limit applies on a per location/project basis. The policy shall provide the following minimum coverage to protect the Contractor from claims with respect to the operations performed by Contractor and any employee, subcontractor, or supplier, or by anyone for whose acts they may be liable unless a higher coverage is specified in Exhibit A to the Owner - Contractor Agreement, in which case the Contractor shall provide the additional coverage:

Bodily Injury & Property Damage	\$2,000,000 each occurrence
Products & Completed Operations	\$2,000,000 general aggregate per project
Personal & Advertising Injury	\$1,000,000 annual aggregate
Medical Expenses	\$1,000,000 each occurrence
	\$5,000

**B.** This policy shall include coverage relating to explosion, collapse, and underground property damage.

**C.** This policy shall include contractual liability coverage.

**D.** The completed operations coverage shall be maintained for a period of three (3) years after Substantial Completion and acceptance by the Awarding Authority. The Contractor shall provide renewal certificates of insurance to the Awarding Authority as evidence that this coverage is being maintained.

**E.** If the Work includes work to be performed within 50 feet of a railroad, any exclusion for liability assumed under contract for work within 50 feet of a railroad shall be deleted.

**F.** This policy shall include the Awarding Authority, the Owner and anyone else requested by the Awarding Authority as an additional insured via endorsements CG 20 10 for ongoing operations and CG 20 37 for completed operations. This policy shall be primary and non-contributory with respect to any other insurance available to additional insureds.

**G.** The policy shall include endorsement CG 24 04, a Waiver of Subrogation in favor of the Awarding Authority and Owner.

## **3. Automobile Liability.**

**A.** The Contractor shall purchase and maintain the following minimum coverage with respect to the operations of any owned, non-owned, and hired vehicles including trailers used in the performance of the work, unless a higher coverage is specified in Exhibit A to the Owner - Contractor Agreement, in which case the Contractor shall provide the additional coverage:

Bodily Injury & Property Damage	\$2,000,000 combined single limit
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**B.** The policy shall include a CA 99 48 Broadened Pollution Endorsement. If specified in Exhibit A to the Owner – Contractor Agreement, the Contractor, if hauling contaminants and/or pollutants, must adhere to Sections 29 and 30 of the Motor Carrier Act of 1980, which shall include coverage Form MCS-90.

**C.** The policy shall name the Awarding Authority and Owner as additional insureds.

**D.** The policy shall contain a Waiver of Subrogation in favor of the Awarding Authority and Owner.

#### **4. Contractor's Pollution Liability.**

The Contractor shall purchase and maintain coverage for bodily injury and property damage resulting from liability arising out of pollution related exposures such as asbestos abatement, lead paint abatement, tank removal, removal of contaminated soil, etc. The insurance policy shall cover the liability of the Contractor during the process of removal, storage, transport and disposal of hazardous waste and contaminated soil and/or asbestos abatement. The policy shall include coverage for on-Site and off-Site bodily injury and loss of, damage to, or loss of use of property, directly or indirectly arising out of the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gas, waste materials or other irritants, contaminants or pollutants into or upon the land, the atmosphere or any water course or body of water, whether it be gradual or sudden and accidental. The policy shall also include defense and clean-up costs. The Awarding Authority and Owner shall be named as an additional insureds and coverage must be on an occurrence basis. The amount of coverage shall be as follows unless a higher amount is specified in Exhibit A to the Owner - Contractor Agreement, in which case the Contractor shall provide the additional coverage:

Limit of liability	\$1,000,000 per occurrence
	\$3,000,000 aggregate

#### **5. Worker's Compensation.**

**A.** The Contractor shall provide the following coverage in accordance with M.G.L. c.149 §34A and c.152 as amended, unless a higher coverage is specified in Exhibit A to the Owner - Contractor Agreement, in which case the Contractor shall provide the higher coverage:

Worker's Compensation	Statutory limits
Employer's Liability	\$ 500,000 each accident
	\$ 500,000 disease per employee
	\$ 500,000 disease policy aggregate

**B.** If specified in Exhibit A to the Owner - Contractor Agreement the policy must be endorsed to cover United States Longshoremen & Harborworkers Act (USLHW), or Maritime Liability.

**C.** The policy shall contain a Waiver of Subrogation in favor of the Awarding Authority and Owner.

#### **6. Builder's Risk/ Installation Floater/Stored Materials.**

**A.** The Contractor shall purchase and maintain coverage against loss or damage on all Work included in this Contract in an amount equal to the Contract Price. Such coverage shall be written on an all risks basis or equivalent form and shall include, without limitation, insurance against perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, terrorism ("certified" and "non-certified"), collapse, earthquake, flood (if the project is not in an "A" or a "V" flood Zone), windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's



and Contractor's services and expenses required as a result of such insured loss. Unless otherwise specified in this Contract, the limits for earthquake and flood shall be the lesser of the Contract Price or \$10,000,000. This policy and/or installation floater shall include transportation and Stored Materials coverage in an amount equal to the value of the stored materials as required in **C.** below.

**B.** When Work will be completed on existing buildings owned by the Owner, the Contractor shall provide an installation floater, in the full amount of the Contract Price. Such coverage shall be written on an all risks basis or equivalent form and shall include, without limitation, insurance against perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood (if the project is not in an "A" or a "V" flood Zone), windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss. Unless otherwise specified in this Contract, the limits for earthquake and flood shall be the lesser of the Contract Price or \$10,000,000. This policy and/or installation floater shall include transportation and Stored Materials coverage in an amount equal to the value of the stored materials as required in **C.** below.

**C.** The Contractor shall maintain insurance on delivered and/or stored material designated to be incorporated in the Work against fire, theft or other hazards. Any loss or damage of whatever nature to such material while stored at an off Site location shall be forthwith replaced by the Contractor at no expense to the Awarding Authority.

**D.** The policy or policies shall specifically state that they are for the benefit of and payable to the Awarding Authority, the Owner, the Contractor, and all persons furnishing labor or labor and materials for the Contract Work, as their interests may appear. The policy or policies shall list the Awarding Authority, the Owner, the Contractor, and Subcontractors of any tier as named insureds.

**E.** Coverage shall include any costs for work performed by the Designer or any consultant as the result of a loss experienced during the term of this Contract.

**F.** Coverage shall include permission for temporary occupancy and a Waiver of Subrogation in favor of the Awarding Authority and Owner

**G.** Coverage shall be maintained until final acceptance by the Awarding Authority and Owner of the Contract and final payment has been made.

**H.** A loss under the property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds. The Contractor shall pay the subcontractors their just shares of insurance proceeds received by the Contractor and shall require subcontractors to make payments to their sub-subcontractors in similar manner.

### **7. Umbrella Coverage.**

The Contractor shall provide Umbrella Coverage in a form at least as broad as primary coverages required by Sections 2, 3 and 5 of this Article in the following amount unless a higher amount is specified in Exhibit A to the Owner - Contractor Agreement, in which case the Contractor shall provide the higher amount:

<u>Contract Price:</u>	<u>Limit of Liability:</u>
Under \$1,000,000	\$2,000,000 per occurrence
\$1,000,001 -- \$5,000,000	\$5,000,000 per occurrence
\$5,000,001-- \$10,000,000	\$10,000,000 per occurrence
\$10,000,001 and over	\$25,000,000 per occurrence

### **8. Additional Types of Insurance.**

The Contractor shall provide such other types of insurance as may be required by Exhibit A to the Owner - Contractor Agreement.

## **ARTICLE XV: INDEMNIFICATION**

### **1. Generally.**

To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner, Awarding Authority and Designer and their officers, agents, divisions, agencies, employees, representatives, successors and assigns from and against all claims, damages, losses and expenses, including but not limited to court costs and attorneys' fees, arising out of or resulting from the performance of the Work, including but not limited to those arising or resulting from:

- labor performed or furnished and/or materials used or employed in the performance of the Work;
- violations by Contractor, any Subcontractor, or by any person directly or indirectly employed or used by any of them in the performance of the Work or anyone for whose acts any of them may be liable (Contractor, subcontractor and all such persons herein collectively called "Contractor's Personnel") of any Laws;
- violations of any provision of this Contract by any of Contractor's Personnel;
- injuries to any persons or damage to any property in connection with the Work;
- any act, omission, or neglect of Contractor's Personnel.

The Contractor shall be obligated as provided above, regardless of whether or not such claims, damages, losses and/or expenses, are caused in whole or in part by the actions or inactions of a party indemnified hereunder. In any and all claims by Contractor's Personnel against parties indemnified hereunder, the Contractor's indemnification obligation set forth above shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Article XV.

### **2. Designer's Actions.**

The obligations of the Contractor under Section 1 above shall not extend to the liability of the Designer, its agents or employees, arising out of (i) the preparation or approval of maps, Drawings, opinions, reports, surveys Change Orders, designs or specifications, or (ii) the giving of or the failure to give directions or instructions by the Designer, its agents to employees provided such giving or failure to give is the primary cause of the injury or damage.

### **3. Survival.**

The provisions of this Article XV are intended to survive Final Acceptance and/or any termination of this Contract.

## **ARTICLE XVI: PERFORMANCE AND PAYMENT BONDS**

### **1. Contractor Bonds.**

**A.** The Contractor shall provide performance and payment (labor and materials) bonds in the form provided by the Awarding Authority, executed by a surety licensed by the Commonwealth of Massachusetts Division of Insurance. Each such bond shall be in the amount of the Contract Price.

**B.** If at any time prior to final payment to the Contractor, the Surety:

- is adjudged bankrupt or has made a general assignment for the benefit of its creditors;
- has liquidated all assets and/or has made a general assignment for the benefit of its creditors;
- is placed in receivership;
- otherwise petitions a state or federal court for protection from its creditors; or
- allows its license to do business in Massachusetts to lapse or be revoked;

then the Contractor shall, within 21 days of any such action listed above, provide the Awarding Authority with new performance and payment bonds as described in Paragraph A above. Such bonds shall be provided solely at the Contractor's expense.

## **2. Subcontractor Bonds.**

**A.** If the Contractor provided in its General Bid that any or all filed subcontractors shall provide the Contractor with payment and performance bonds for the full amount of their respective Subcontracts, then the costs for said bonds shall be the responsibility of the Contractor.

**B.** If the Contractor provided in its General Bid that filed Subcontractors shall provide bonds, and subsequently waives the requirement, the Contractor shall give the Awarding Authority a written certification that the Contractor understands that if the filed Subcontractor defaults or is terminated, the Contractor shall have full responsibility for all costs and expenses related to said default or termination but shall be entitled to a credit adjustment to the Contract Price in an amount equal to the bond premium Contractor would have paid had Contractor required the filed Subcontractor to provide such bonds.

## **ARTICLE XVII: TERMINATION OF CONTRACT**

### **1. Termination for Cause.**

**A.** The Awarding Authority may without prejudice to any other right or remedy deem this Contract terminated for cause if any of the following defaults shall occur and not be cured within three (3) days after the giving of notice thereof by the Awarding Authority to the Contractor and any surety that has given bonds in connection with this Contract:

- (1) The Contractor has filed a petition, or a petition has been filed against the Contractor with its consent, under any federal or state law concerning bankruptcy, reorganization, insolvency or relief from creditors, or if such a petition is filed against the Contractor without its consent and is not dismissed within sixty (60) days; or if the Contractor is generally not paying its debts as they become due; or if the Contractor becomes insolvent; or if the Contractor consents to the appointment of a receiver, trustee, liquidate, custodian or the like of the Contractor or of all or any substantial portion of its assets and such appointment or possession is not terminated within sixty (60) days; or if the Contractor makes an assignment for the benefit of creditors;
- (2) The Contractor refuses or fails, except in cases for which extension of time is provided under this Contract's express terms, to supply enough properly skilled workers or proper materials to perform its obligations under this Contract, or the Designer has determined that the rate of progress required for the timely completion of the Work is not being met;
- (3) The Contractor fails to make prompt payment to Subcontractors or for materials, equipment, or labor;
- (4) All or a part of the Work has been abandoned;
- (5) The Contractor has sublet or assigned all or any portion of the Work, the Contract, or claims thereunder, without the prior written consent of the Owner, except as expressly permitted in this Contract;
- (6) The Contractor has failed to comply with Laws;
- (7) The Contractor fails to maintain, or provide to the Awarding Authority evidence of the insurance or bonds required by this Contract, or
- (8) The Contractor has failed to prosecute the Work or any portion thereof to the standards required under this Contract or has otherwise breached any material provision of this Contract.

**B.** The Awarding Authority shall give the Contractor and any surety notice of such termination for cause, but the giving of notice of such termination shall not be a condition precedent or subsequent to the termination's effectiveness. In the event of such termination, and without limiting any other available remedies, the Awarding Authority may, at its option:

- (1) hold the Contractor and its sureties liable in damages for a breach of Contract;

- (2) notify the Contractor to discontinue all work, or any part thereof, and the Contractor shall discontinue all work, or any part thereof, as the Owner may designate;
- (3) complete the Work, or any part thereof, and charge the expense of completing the Work or part thereof, to the Contractor;
- (4) require the surety or sureties to complete the Work and perform all of the Contractor's obligations under this Contract.

If the Awarding Authority elects to complete all or any portion of the Work as specified in (3) above, it may take possession of all materials, equipment, tools, machinery, implements at or near the Site owned by the Contractor and finish the Work at the Contractor's expense by whatever means the Awarding Authority may deem expedient; and the Contractor shall cooperate at its expense in the orderly transfer of the same to a new contractor or to the Awarding Authority as directed by the Awarding Authority. In such case the Awarding Authority shall not make any further payments to the Contractor until the Work is completely finished. The Owner shall not be liable for any depreciation, loss or damage to said materials, machinery, implements or tools during said use and the Contractor shall be solely responsible for their removal from the Site after the Owner has no further use for them. Unless so removed within fifteen days after notice to the Contractor to do so, they may be sold at public auction, after publication of notice thereof at least twice in any newspaper published in the county where the Work is being performed, and the proceeds credited to the Contractor's account; or they may, at the option of the Awarding Authority, be stored at the Contractor's expense subject to a lien for the storage charges.

**C.** Damages and expenses incurred under paragraph B above shall include, but not be limited to, costs for the Designer's extra services and Project Representative services required, in the opinion of the Awarding Authority, to successfully inspect and administer the construction contract through final completion of the Work.

**D.** Expenses charged under paragraph B above may be deducted and paid by the Awarding Authority out of any moneys then due or to become due the Contractor under this Contract.

**E.** All sums damages, and expenses incurred by the Owner to complete the Work shall be charged to the Contractor. In case the damages and expenses charged are less than the sum that would have been payable under this Contract if the same had been completed by the Contractor, the Contractor shall be entitled to receive the difference. In case such expenses shall exceed the said sum, the Contractor shall pay the amount of the excess to the Owner.

## **2. Termination For Convenience.**

**A.** The Awarding Authority may terminate this Contract for convenience even though the Contractor is not in default by giving notice to the Contractor specifying in said notice the date of termination.

**B.** In case of such termination without cause, the Contractor shall be paid:  
(1) all sums due and owing under this Contract through the date of termination, including any retainage withheld to the date of termination, less any amount which the Awarding Authority determines is necessary to correct or complete the Work performed to the date of termination; plus (2) a reasonable sum to cover the expenses which Contractor would not have incurred but for the early termination of the Contract, such as demobilization of the work force, restocking charges, termination fees payable to Subcontractors.

**C.** The payment provided in paragraph B above shall be considered to fully compensate the Contractor for all claims and expenses and those of any consultants, Subcontractors, and suppliers, directly or indirectly attributable to the termination, including any claims for lost profits.

## **3. Contractor's Duties Upon Termination For Convenience.**

Upon termination of this Contract for convenience as provided in Section 2 of this Article, the Contractor shall: (1) stop the Work; (2) stop placing orders and Subcontracts in connection with this Contract; (3) cancel all existing orders and Subcontracts; (4) surrender the Site to the Awarding Authority in a safe condition; (5)

transfer to the Awarding Authority all materials, supplies, work in process, appliances, facilities, equipment and machinery of this Contract, and all plans, Drawings, specifications and other information and documents used in connection with this Contract.

## **ARTICLE XVIII: MISCELLANEOUS PROVISIONS**

### **1. No Assignment by Contractor.**

The Contractor shall not assign by power of attorney or otherwise, or sublet or subcontract, the Work or any part thereof, without the previous written consent of the Awarding Authority and shall not, either legally or equitably, assign any of the moneys payable under this Contract, or Contractor's claims hereunder, unless with the like consent of the Awarding Authority, whether said assignment is made before, at the time of, or after the execution of the Contract. The Contractor shall remain responsible for satisfactory performance of all Work sublet or assigned. Consent of the Awarding Authority shall not be deemed to constitute a representation or waiver of any right hereunder by the Awarding Authority as to the qualifications or the responsibility of the Contractor or Subcontractor(s).

### **2. Non-Appropriation.**

If the Awarding Authority is unable to obtain an appropriation of funds sufficient to discharge the Town of Ayer's obligations under this Agreement for any fiscal year during the term of this Agreement, the Town of Ayer shall not be obligated to make any further payments, and this Agreement may be terminated immediately by either the Town of Ayer or the Contractor, provided that the Town of Ayer shall make payment to the Contractor for obligations incurred during the period for which funding was included in an annual or supplemental appropriation. Delay by the General Court in enacting an annual or supplemental appropriation bill shall not be grounds for termination of this Agreement pursuant to this Section, unless such annual or supplemental appropriation bill as enacted and signed by the Governor contains insufficient funding for obligations pursuant to this Agreement.

### **3. Claims by Others Not Valid.**

No person other than the Contractor shall acquire any interest in this Contract or claim against the Awarding Authority or Owner hereunder, and no claim by any other person shall be valid except as provided in M.G.L. c. 30, s. 39F of the General Laws.

### **4. No Personal Liability of Public Officials.**

No public official, employee, or agent of the Awarding Authority or Owner shall have any personal liability for the obligations of the Awarding Authority or Owner set forth in this Contract.

### **5. Severability.**

The provisions of this Contract are severable, and if any of these provisions shall be held unconstitutional or unenforceable by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the other provisions of this Contract.

### **6. Choice of Laws.**

This Contract shall be governed by the laws of the Commonwealth of Massachusetts for all purposes, without regard to its laws on choice of law. All proceedings under this Contract or related to the Project shall be brought in the courts of the Commonwealth of Massachusetts.

### **7. Standard Forms.**

Unless directed otherwise in writing by the Awarding Authority, Contractor shall use the standard forms in use by the Division of Capital Asset Management and Maintenance listed below:

#### **Procedure for Payment to Contractors**

**Payment Voucher Input Form**  
**Requisition for Payment (DCAMM Form S1b) and Instructions**  
**Monthly Requisition Breakdown (DCAMM Form 55)**  
**Instructions Regarding Change Orders and Contract Modifications**  
**(DCAMM Form 13)**  
**Daily Time and Material Report for Change Orders**  
**Request and Agreement for a Change in the Plans,**  
**Specifications and/or Contract (DCAMM Form 5)**  
**Notice of Intent**  
**Contractor's Weekly Workforce Report**  
**Minorities/Women in Contractor's Weekly Workforce Report**  
**Weekly Payroll Report Form and Statement of Compliance**  
**Quarterly Projected Workforce Table**  
**Certification of Payment by Contractor to MBE/WBE and Instructions**  
**Certificate of Completion by Minority/Women Business Enterprise**  
**Form for Transfer of Title (Work Not Incorporated, DCAMM Form 16)**  
**Certificate of Agency Use and Occupancy -E-1**  
**Certificate of Final Inspection, Release and Acceptance - E-2**

**8. No Waiver of Subsequent Breach.**

No waiver of any breach or obligation of this Contract shall constitute a waiver of any other or subsequent breach or obligation.

**9. Remedies Cumulative.**

All remedies of the Awarding Authority provided in this Contract shall be construed as cumulative and may be exercised simultaneously or in any order as determined by the Awarding Authority in its sole discretion. The Awarding Authority shall also be entitled as of right to specific performance and equitable relief including the right to an injunction against any breach of any of the provisions of this Contract

**10. Notices.**

Notices to the Contractor shall be deemed given when hand delivered to the Contractor's temporary field office at or near the Site, or when deposited in the U.S. mail addressed to the Contractor at the Contractor's address specified in the Owner - Contractor Agreement, or when delivered by courier to either location. Unless otherwise specified in writing by the Awarding Authority, notices and deliveries to the Awarding Authority shall be effective only when delivered to the Awarding Authority at the address specified in the Owner - Contractor Agreement and date-stamped at the reception desk or for which a receipt has been signed by the agent or employee designated by the Awarding Authority to receive official notices.

## **APPENDIX A to General Conditions of the Contract**

The following provisions form Article XII of the General Conditions of the Contract where DCAMM is the Awarding Authority.

### **EQUAL EMPLOYMENT OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM.**

#### **Compliance Generally.**

For purpose of this Article, "minority" refers to Asians, Blacks, Western Hemisphere Hispanics, Native Americans, and Cape Verdeans; "Commission" refers to the Massachusetts Commission Against Discrimination. During the performance of this Contract, the Contractor and all of its Subcontractors (hereinafter collectively referred to as the Contractor) shall comply with all applicable equal employment opportunity, non-discrimination and affirmative action requirements, including but not limited to the following:

#### **2. Non-Discrimination and Affirmative Action.**

**A.** The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age, handicap, sexual orientation, or sex. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion or transfer; recruitment advertising; recruitment layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship. The Contractor shall comply with the provisions of M.G.L. c. 151B and all other applicable anti-discrimination and equal opportunity laws.

**B.** The Contractor shall comply with the provisions of Executive Order 478, entitled Order Regarding Nondiscrimination, Diversity, Equal Opportunity and Affirmative Action, which prohibits unlawful discrimination based on race, color, age, gender, ethnicity, sexual orientation, religion, creed, ancestry, national origin, disability, veteran's status (including Vietnam-era veterans), or background. Executive Order 478 is herein incorporated by reference and made a part of this Contract.

Pursuant to Executive Order 478 the Contractor and any subcontractors may not engage in discriminatory employment practices; and the Contractor must certify that it is in compliance with all applicable federal and state laws, rules, and regulations governing fair labor and employment practices; and commit to purchasing supplies and services from certified minority or women-owned businesses, small businesses, or businesses owned by socially or economically disadvantaged persons or persons with disabilities. These provisions shall be enforced through the contracting agency, the Operational Services Division, and/or the Massachusetts Commission Against Discrimination. Any breach shall be regarded as a material breach of Contract that may subject Contractor to appropriate sanctions. The Contractor shall comply with the provisions of Executive Order No. 246 entitled Revoking and Superseding Executive Orders Numbers 143 and 150, with respect to affirmative action programs for handicapped individuals, which is herein incorporated by reference and made a part of this Contract.

**C.** In connection with the performance of the Work, the Contractor shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age, sexual orientation, or sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, and in-service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, age, sexual orientation, or sex. A purpose of this provision is to ensure to the fullest extent

possible an adequate supply of skilled tradesmen for future public construction projects.

**D.** If the Contractor shall use any subcontractor on any work performed under this Contract, the Contractor shall take affirmative steps to negotiate with qualified minority and women subcontractors. These affirmative steps shall cover both pre-bid and post-bid periods. It shall include notification to the State Office of Minority and Women Business Assistance or its designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids. In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this Contract relative to non-discrimination and affirmative action.

**E.** As part of its obligation of remedial action under this Article, the Contractor shall maintain on this project not less than the percent ratio set forth in the Owner - Contractor Agreement of minority employee worker hours to total worker hours in each job category including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those "classes of work" enumerated in M.G. L. c. 149, s. 44F.

**G.** In the hiring of minority journeypersons, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals from a multi-employer affirmative action program approved by the Commission, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee or the Awarding Authority.

### **3. Liaison Committee, Reports and Records.**

**A.** At the option of the Awarding Authority, there may be established for the term of this Contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the Awarding Authority, the Commission and such other representatives as may be designated by the Commission in conjunction with the Awarding Authority. The Contractor (or his agent, if any, designated by him as the on-Site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

**B.** The Contractor shall prepare projected staffing tables on a quarterly basis. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also when updated, to the Awarding Authority and Liaison Committee. The Contractor shall prepare weekly reports in a form approved by the Awarding Authority of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these shall be provided at the end of each such week to the Awarding Authority and to the Liaison Committee.

**C.** Records of employment referral orders, prepared by the Contractor, shall be made available to the Awarding Authority and to the Liaison Committee on request.

**D.** A designee of the Awarding Authority and a designee of the Liaison Committee shall each have right to access to the Site.

**E.** The Contractor shall comply with the provisions of M.G.L. c. 151B as amended, of the Massachusetts General Laws, both of which are herein incorporated by reference and made a part of this Contract.

**F.** The Contractor shall provide all information and reports required by the Awarding Authority or the Commission on forms and in accordance with instructions issued by either of them and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the Awarding Authority or the Commission to affect the employment of personnel. This provision shall apply only to information pertinent to the Owner's supplementary affirmative action Contract requirements. Where information required is in the exclusive possession of



another who fails or refuses to furnish this information, the Contractor shall so certify to the Awarding Authority or the Commission as appropriate and shall set forth what efforts he has made to obtain the information.

#### **4. Sanctions.**

**A.** Whenever the Awarding Authority, the Commission, or the Liaison Committee believes the Contractor or any Subcontractor may not be operating in compliance with the terms of this Article, the Commission shall directly, or through its designated agent, conduct an appropriate investigation, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Article. If the Commission or its agent finds the Contractor or any Subcontractor not in compliance, it may make a preliminary report on non-compliance, and notify such Contractor in writing of such steps as will in the judgment of the Commission or its agent bring such Contractor into compliance. In the event that such Contractor fails or refuses to fully perform such steps, the Commission **may** make a final report of non-compliance, and recommend to the Awarding Authority the imposition of one or more of the sanctions listed below. If, however, the Commission believes the Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of non-compliance. Within fourteen days of the receipt of the recommendations of the Commission, the Awarding Authority shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:

- (1) The recovery by the Awarding Authority from the Contractor of 1/100 of 1% of the Contract award price or \$1,000 whichever sum is greater, in the nature of liquidated damages or, if a Subcontractor is in non-compliance, the recovery by the Awarding Authority from the Contractor, to be assessed by the Contractor as a back charge against the subcontractor, of 1/10 of 1% of the sub-Contract Price, or \$400 whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply;
- (2) The suspension of any payment or part thereof due under the Contract until such time as the Contractor or any subcontractor is able to demonstrate his compliance with the terms of the Contract;
- (3) The termination or cancellation of the Contract, in whole, or in part, unless the Contractor or any Subcontractor is able to demonstrate within a specified time his compliance with the terms of the contract;
- (4) The denial to the Contractor or any subcontractor of the right to participate in any future contracts awarded by the Awarding Authority for a period of up to three years.

**B.** If at any time after the imposition of one or more of the above sanctions a Contractor is able to demonstrate that it is in compliance with this Article, the Contractor may request the Awarding Authority, in consultation with the Commission, to suspend the sanctions conditionally, pending a final determination by the Commission as to whether the Contractor is in compliance. Upon final determination of the Commission, the Awarding Authority, based on the recommendation of the Commission, shall either lift the sanctions or reimpose them.

**C.** Sanctions recommended by the Commission and enumerated under Section 4 above shall not be imposed by the Awarding Authority except after an adjudicatory proceeding, as that term is used M.G.L. c. 30A, has been conducted. No investigation by the Commission or its agent shall be initiated without prior notice to the Contractor.

**D.** Notwithstanding the provisions of 4A-4C above, if the Awarding Authority determines after investigation that the Contractor or any Subcontractor is not in compliance with the terms of this Article, it may suspend any payment or portion thereof due under the Contract until the contractor demonstrates to the satisfaction of the Awarding Authority compliance with the terms of this Article. This temporary suspension of payments by the Awarding Authority is separate from the sanctions set forth in Section 4A-4C of this Article above, which are determined by MCAD and recommend to the Awarding Authority. Payment may be suspended only after the Contractor and any other interested party shall have been given the opportunity to present evidence in support of its position at an informal hearing held

by the Awarding Authority, and the Awarding Authority has concluded upon review of all the evidence that such penalty is justified. Payment shall not be suspended if the Awarding Authority finds that the Contractor made its best efforts to comply with this Article, or that some other justifiable reason exists for waiving the provisions of this Article in whole or in part.

## **APPENDIX B to General Conditions of the Contract**

The following provisions form Article XIII of the General Conditions of the Contract where DCAMM is the Awarding Authority.

### **GOALS FOR PARTICIPATION BY MINORITY BUSINESS ENTERPRISES AND WOMEN BUSINESS ENTERPRISES (EXECUTIVE ORDER 390, EXECUTIVE ORDER 478, M.G.L. c. 7, s. 40N)**

#### **1. Goals.**

**A.** The goals for minority business enterprise and woman business enterprise participation established for this Contract are as set forth in the Owner - Contractor Agreement.

**B.** The Contractor and all Subcontractors, sub-subcontractors, and materials suppliers shall comply with all of the terms and conditions of this Article, which include the provisions pertaining to MBE/WBE participation set forth in the Owner - Contractor Agreement in order to meet the MBE/WBE participation goals established for this Contract.

#### **2. MBE/WBE Participation Credit.**

**A.** If the Contractor is itself an MBE or WBE, MBE/WBE participation credit shall be given in an amount equal to the entire Contract Price. If the Contractor is not an MBE or WBE, then MBE/WBE participation credit will be given for the value of the Work that is actually performed by each MBE or WBE subcontractor or sub-subcontractor.

**B.** If the Contractor is a joint venture with one or more MBE/WBE joint venturers, MBE/WBE participation credit shall be given to the joint venture as follows:

- (1) If the joint venture is certified by SOMBWA as an MBE or WBE, MBE/WBE participation credit shall be given in an amount equal to the entire Contract Price.
- (2) If the joint venture is not certified as an MBE or WBE by the Supplier Diversity Office (SDO), MBE/WBE participation credit shall be given to the joint venture for the value of the Work that is performed by the MBE/WBE joint venturer(s), and for the value of the Work that is actually performed by each MBE or WBE subcontractor or sub-subcontractor.

**C.** If an MBE/WBE supplies but does not install equipment or materials, MBE/WBE participation credit shall be given only if the MBE/WBE supplier is regularly engaged in sales of equipment or supplies to the construction industry from an established place of business. MBE/WBE participation credit shall be given the full amount of the purchase order only if the MBE/WBE supplier manufactures the goods or substantially alters them before resale. In all other cases, MBE/WBE participation credit shall be given for 10% of the purchase order.

**D.** MBE participation credit shall be given for the work performed by MBEs only, and WBE participation credit shall be given for the work performed by WBEs only. MBE participation may not be substituted for WBE participation, nor may WBE participation be substituted for MBE participation.

#### **3. Establishing MBE/WBE Status.**

**A.** A minority owned business shall be considered an MBE only if it has been certified as a minority business enterprise by the Supplier Diversity Office ("SDO" formerly SOMWBA).

**B.** A woman owned business shall be considered a WBE only if it has been certified as a woman business enterprise by SDO.

**C.** Certification as a disadvantaged business enterprise ("DBE"), certification as an MBE/WBE by any agency other than SDO, or submission of an application to SDO for certification as an MBE/WBE shall not confer MBE/WBE status on a firm for the purposes of this Contract.

**4. Subcontracts With MBE/WBEs.**

Within thirty (30) days after the award of this Contract, the Contractor shall (i) execute a subcontract with each MBE/WBE Subcontractor which has executed a Letter of Intent Approved by the Awarding Authority, (ii) cause its Subcontractors to execute a sub-subcontract with each MBE/WBE sub-subcontractor, and (iii) furnish the Awarding Authority with a signed copy of each such subcontract and sub-subcontract.

**5. Performance of Contract Work by MBE/WBEs.**

**A.** The Contractor shall not perform with its own organization, or subcontract or assign to any other firm, work designated to be performed by any MBE/WBE in the Letters of Intent or Schedule for MBE/WBE Participation without the prior written Approval of the Awarding Authority, nor shall any MBE/WBE assign or subcontract to any other firm, or permit any other firm to perform any of its MBE/WBE Work without the prior written Approval of the Awarding Authority. Any such unapproved assignment, subcontracting, sub-subcontracting, or performances of BE/WBE Work by others shall be a change in the MBE/WBE Work for the purposes of this Contract. The Awarding Authority WILL NOT APPLY TO THE MBE/WBE PARTICIPATION GOAL(S) ANY SUMS ATTRIBUTABLE TO SUCH UNAPPROVED ASSIGNMENTS, SUB-CONTRACTS, SUB-SUBCONTRACTS, OR PERFORMANCE OF MBE/WBE WORK BY OTHERS.

**B.** The Contractor shall be responsible for monitoring the performance of MBE/WBE Work to ensure that each scheduled MBE/WBE performs its own MBE/WBE Work with its own workforce.

**C.** The Contractor and each MBE/WBE shall provide the Awarding Authority with all information and documentation that the Awarding Authority determines is necessary to ascertain whether or not an MBE/WBE has performed its own MBE/WBE Work. At the discretion of the Awarding Authority, failure to submit such documentation to the Awarding Authority shall establish conclusively for the purpose of giving MBE/WBE participation credit under this Contract that such MBE/WBE did not perform such work.

**6. Notification of Changes in MBE/WBE Work.**

**A.** If at any time during the performance of the Contract the Contractor determines or has reason to believe that a scheduled MBE/WMBE is unable or unwilling to perform its MBE/WBE Work, or that there has been or will be a change in any MBE/WBE Work, or that the Contractor will be unable to meet the MBE/WBE participation goal(s) for this Contract for any reason, the Contractor shall immediately notify the Awarding Authority Contract Compliance Office in writing of such circumstances.

**B.** Any notice of a change in MBE/WBE Work pursuant to subparagraph “A” above shall include a revised Schedule for MBE/WBE Participation, and additional or amended Letters of Intent and subcontracts, as the case may be.

**7. Actions Required If There is a Reduction in MBE/WBE Participation.**

**A.** In the event there is a change or reduction in any MBE/WBE Work which will result in the Contractor failing to meet the MBE/WBE participation goal(s) for this Contract, other than a reduction in MBE/WBE Work resulting from a Change Order initiated by the Awarding Authority, then the Contractor shall immediately undertake a diligent, good faith effort to make up the shortfall in MBE/WBE participation as follows:

(1) The Contractor shall identify all items of the Work remaining to be performed under the Contract that may be made available for subcontracting to MBE/WBEs. The Contractor shall send a list of such items of work to the Awarding Authority, together with a list of the remaining items of the Work that were not made available to MBE/WBEs and the reason for not making such work available for subcontracting to MBE/WBEs.

(2) The Contractor shall send written notices soliciting proposals to perform the items of the Work that may be made available for subcontracting to MBE/WBEs to all MBE/WBEs qualified to perform such work. The Contractor shall advise the Awarding Authority of (i) each MBE/WBE solicited, and (ii) each MBE/WBE listed in the SDO directory under the applicable trade category who was not solicited and the reasons therefor. The Contractor shall also advise the Awarding Authority of the dates notices were mailed and provide a copy of the written notice(s) sent.

(3) The Contractor shall make reasonable efforts to follow up the written notices sent to MBE/WBEs with telephone calls or personal visits in order to determine with certainty whether the MBE/WBEs were interested in performing the work. Phone logs or other documentation must be submitted to the Awarding Authority evidencing this effort.

(4) The Contractor shall make reasonable efforts to assist MBE/WBEs that need assistance in obtaining insurance, bonds, or lines of credit in order to perform work under the Contract, and shall provide the Awarding Authority with evidence that such efforts were made.

(5) The Contractor shall provide the Awarding Authority with a statement of the response received from each MBE/WBE solicited, including the reason for rejecting any MBE/WBE who submitted a proposal, if applicable.

(6) The Contractor shall take any additional measures reasonably requested by the Awarding Authority to meet the MBE/WBE participation goal(s) established for this Contract, including, without limitation, placing advertisements in appropriate media and trade association publications announcing the Contractor's interest in obtaining proposals from MBE/WBEs, and/or sending written notification to MBE/WBE economic development assistance agencies, trade groups and other organizations notifying them of the project and of the work available to be subcontracted by the Contractor to MBE/WBEs.

**B.** If the Contractor is unable to meet the MBE/WBE participation goals for this Contract after complying fully with each of the requirements of paragraph "A" above, and the Contractor is otherwise in full compliance with the terms of this Article, the Awarding Authority may reduce the MBE/WBE participation goals for this Contract to the extent that such goals cannot be achieved.

## **8. Suspension of Payment and/or Performance for Noncompliance.**

**A.** If at any time during the performance of this Contract, the Awarding Authority determines or has reason to believe that (1) there has been a change or reduction in any MBE/WBE Work which will result in the Contractor failing to meet the MBE/WBE participation goal(s) for this Contract, other than a reduction in MBE/WBE Work resulting from a change in the Contract work ordered by the Awarding Authority, and (2) the Contractor has failed to comply fully with all of the terms and conditions of paragraphs 1 through 7 above, the Awarding Authority may: (1) suspend payment to the Contractor of an amount up to the full value of the work which was to have been performed by an MBE/WBE pursuant to the Contractor's Schedule for MBE/WBE Participation but which was not so performed, in order to ensure that sufficient Contract funds will be available if liquidated damages are assessed pursuant to paragraph 9, and/or

(2) suspend the Contractor's performance of this Contract in whole or in part.

**B.** The Awarding Authority shall give the Contractor prompt written notice of any action taken pursuant to paragraph A above and shall give the Contractor and any other interested party, including any MBE/WBEs, an opportunity to present evidence to the Awarding Authority that the Contractor is in compliance with the requirements of this Article, or that there is some justifiable reason for waiving the requirements of this Article in whole or in part. The Awarding Authority may invite SDO and the Massachusetts Commission Against Discrimination to participate in any proceedings undertaken pursuant to this paragraph.

**C.** Upon a showing that the Contractor is in full compliance with the requirements of this Article, or that the Contractor has met or will meet the MBE/WBE participation goals for this Contract, the Awarding Authority shall release any funds withheld

pursuant to clause A(1) above, and lift any suspension of the Contractor's performance under clause A(2) above.

**9. Liquidated Damages; Termination.**

A. If payment by the Awarding Authority or performance by the Contractor is suspended by the Awarding Authority as provided in paragraph 8 above, the Awarding Authority shall have the following rights and remedies if the Contractor thereafter fails to take all action necessary to bring the Contractor into full compliance with the requirements of this Article, or if full compliance is no longer possible because the default of the Contractor is no longer susceptible to cure, if the Contractor fails to take such other action as may be required by the Awarding Authority to meet the MBE/WBE participation goals set forth in this Contract:

(1) the Awarding Authority may terminate this Contract, and/or  
(2) the Awarding Authority may retain from final payment to the Contractor, as liquidated damages, an amount equal to the difference between (x) the total of the MBE/WBE participation goals set forth in this Contract, and (y) the amount of MBE/WBE participation credit given to the Contractor for MBE/WBE Work performed under this Contract as determined by the Awarding Authority, the parties agreeing that the damages for failure to meet the M/BE/WBE participation goals are difficult to determine and that the foregoing amount to be retained by the Awarding Authority represents the parties' best estimate of such damages. Any liquidated damages will be assessed separately for MBE and WBE participation.

B. Before exercising its rights and remedies hereunder, the Awarding Authority may, but the Awarding Authority shall not be obligated to, give the Contractor and any other interested party another opportunity to present evidence to the Awarding Authority that the Contractor is in compliance with the requirements of this Article or that there is some justifiable reason for waiving the requirements of this Article in whole or in part. The Awarding Authority may invite SDO and the Massachusetts Commission Against Discrimination to participate in any proceedings undertaken hereunder.

**10. Reporting Requirements.**

The Contractor shall submit to the Awarding Authority all information or documentation that is necessary in the judgment of the Awarding Authority to ascertain whether or not the Contractor has complied with any of the provisions of this Article.

**11. Awarding Authority's Right to Waive Provisions of this Article in Whole or In Part.**

The Awarding Authority reserves the right to waive any provision or requirement of this Article if the Awarding Authority determines that such waiver is justified and in the public interest. No such waiver shall be effective unless in writing and signed by a representative of the Awarding Authority's Compliance Office or the Office of its General Counsel. No other action or inaction by the Awarding Authority shall be construed as a waiver of any provision of this Article.



SECTION 01550

SIGNAGE (TRAFFIC CONTROL)

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers furnishing and installing traffic control signs and other devices and insuring that public works activities are not disrupted.

1.02 SYSTEM DESCRIPTION:

- A. The Contractor shall furnish and install all construction signs deemed necessary by and in accordance with the latest edition of Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) as published by the U.S. Department of Transportation to insure that the traffic flow in the public works facility is not interrupted.

PART 2 - PRODUCTS

2.01 TRAFFIC WARNING AND REGULATING DEVICES:

- A. Contractor shall provide warning signs, barricades and other devices in accordance with the specifications provided in the MUTCD. Size of signs, lettering, colors, method of support and other factors prescribed in the MUTCD shall be adhered to.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Contractor shall erect barricades, barrier fences, traffic signs, and other traffic control devices as required by the MUTCD, or as required by the Engineer, to protect the work area from traffic, pedestrians, and animals.
- B. Contractor shall relocate barricades, signs and other devices as necessary as the work progresses.
- C. Unless extended protection is required for specific areas, when the work has been completed, all temporary warning and regulatory devices used by the Contractor shall be removed so that traffic can move unimpeded through the area.
- D. The Contractor shall insure that his operations do not impede or interfere with the operations of the public works facility.

END OF SECTION



SECTION 01562DUST CONTROLPART 1 - GENERAL1.1 DESCRIPTIONS

## A. Work Included:

1. Furnish and apply water or calcium chloride on the road surfaces within the construction site, when required to control dust and when directed by the Engineer.
2. When dust control is not included as a separate item in the Contract, the work shall be considered incidental to the appropriate items of the Contract.

PART 2 - PRODUCTS2.1 MATERIALS

## A. Water for Sprinkling:

1. Clean, free of salt, oil, and other injurious matter.

## B. Calcium Chloride:

1. Meet the requirements of AASHTO M144.

PART 3 - EXECUTION3.1 APPLICATION

## A. Water:

1. Apply water by methods approved by the Engineer.
2. Use approved equipment including a tank with gauge equipped pump and spray bar.

## B. Calcium Chloride:

1. Apply at a rate sufficient to maintain a damp surface but low enough to assure non-contamination of water courses.
2. Apply water prior to calcium chloride addition.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing Contractor's selection of products for use in Project where named by specific manufacturer and/or product or described by physical properties without naming manufacturer and/or product.

B. Related Sections:

1. Division 1 for Submittal Procedures; Section 01200 for Contractor's Construction Schedule and Schedule of Submittals.

C. Definitions:

1. General:

- a. Definitions used in this Article are not intended to change meaning of other terms used in Contract Documents, such as, specialties, systems, structure, finishes, accessories, and similar terms.
- b. Such terms are self-explanatory and have well-recognized meanings in construction industry.

2. Products:

- a. Items purchased for incorporation in work, whether purchased for Project or taken from previously purchased stock.
- b. The term product includes terms material, equipment, system, and terms of similar intent.
- c. Named Products: Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, current as of date of Contract Documents.

3. Materials: Products substantially shaped, cut, worked, mixed, finished, refined, or otherwise fabricated, processed, or installed to form part of work.

4. Equipment: Product with operational parts, whether motorized or manually operated, requiring service connections such as wiring or piping.

D. Deviations from Plans and Specifications:

**M.G.L. c.30, '391:** *Deviations from plans and specifications.*

*Every contractor having a contract for the construction, alteration, maintenance, repair or*

*demolition of, or addition to, any public building or public works for the commonwealth, or of any political subdivision thereof, shall perform all the work required by such contract in conformity with the plans and specifications contained therein. No willful and substantial deviation from said plans and specifications shall be made unless authorized in writing by the awarding authority or by the engineer or architect in charge of the work who is duly authorized by the awarding authority to approve such deviations. In order to avoid delays in the prosecution of the work required by such contract such deviation from the plans or specifications may be authorized by a written order of the awarding authority or such engineer or architect so authorized to approve such deviation. Within thirty days thereafter, such written order shall be confirmed by a certificate of the awarding authority stating:*

*(1) if such deviation involves any substitution or elimination of materials, fixtures or equipment, the reasons why such materials, fixtures or equipment were included in the first instance and the reasons for substitution or elimination, and, if the deviation is of any other nature, the reasons for such deviation, giving justification therefor;*

*(2) that the specified deviation does not materially injure the project as a whole;*

*(3) that either the work substituted for the work specified is of the same cost and quality, or that an equitable adjustment has been agreed upon between the contracting agency and the contractor and the amount in dollars of said adjustment; and*

*(4) that the deviation is in the best interest of the contracting authority.*

*Such certificate shall be signed under the penalties of perjury and shall be a permanent part of the file record of the work contracted for.*

*Whoever violates any provision of this section willfully and with intent to defraud shall be punished by a fine of not more than five thousand dollars or by imprisonment for not more than six months, or both.*

### 1.3 SUBMITTALS

#### A. Product List Schedule:

1. Prepare Schedule showing products specified in tabular form acceptable to Engineer.
2. Include generic names of products required.
3. Include manufacturer's name and proprietary product names for each item listed.
4. Coordinate Product List Schedule with Contractor's Construction Schedule.
5. Form: Prepare Product Listing Schedule with information on each item tabulated under following column headings.
  - a. Related Specification Section number.
  - b. Generic name as used in Contract Documents.
  - c. Proprietary name, model number, and similar designations.
  - d. Manufacturer's name and address.
  - e. Supplier's name and address.
  - f. Installer's name and address.

- g. Projected delivery date, or time span of delivery period.

B. Submittal:

1. Within 30 days after date of commencement of work, submit 3 copies of initial Product List Schedule.
2. Provide written explanation for omissions of data, and for known variations from Contract requirements.
3. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.

C. Completed Schedule:

1. Within 60 days after commencement of work, submit 3 copies of completed Product List Schedule.
2. Provide written explanation for omissions of data and for known variations from Contract requirements.

D. Engineer's Action:

1. Engineer will respond to Contractor in writing within 2 weeks of receipt of completed Product List Schedule.
2. No response within this time constitutes no objection to listed products or manufacturers, but does not constitute waiver of requirement that products comply with Contract Documents.
3. Engineer's response will include following: List of unacceptable product selections, containing brief explanation of reasons for this action.

## 1.4 QUALITY ASSURANCE

A. Source Limitations:

1. To fullest extent possible, provide products of same kind, from single source.
2. When specified products are available only from sources that do not or cannot produce quantity adequate to complete Project requirements in timely manner, consult with Engineer for determination of most important product qualities before proceeding.
3. Qualities may include attributes relating to visual appearance, strength, structural, durability, or compatibility.
4. When determination has been made, select products from sources that produce products possessing these qualities, to fullest extent possible.
5. Products shall be made in the USA.

B. Compatibility of Options:

1. When Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
2. Each prime Contractor is responsible for providing products and construction methods compatible with products and construction methods of other prime or separate Contractors.
3. If dispute arises between prime Contractors over concurrently selectable, but

incompatible products, Engineer will determine which products shall be retained and which are incompatible and must be replaced.

C. Nameplates:

1. Except for required labels and operating data, do not attach or imprint manufacturers or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on exterior.
2. Labels: Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
3. Equipment Nameplates:
  - a. Provide permanent nameplate on each item of service-connected or power-operated equipment.
  - b. Locate on easily accessible surface that is inconspicuous in occupied spaces.
  - c. Nameplate shall contain following information and other essential operating data: Name of Product or Manufacturer, Model and Serial Number, Capacity, Speed, Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods to prevent damage, deterioration and loss, including theft.

B. Delivery:

1. Schedule delivery to minimize long-term storage at site and to prevent overcrowding of construction spaces.
2. Coordinate delivery and installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with Contract Documents, and to ensure products are undamaged and properly protected.

C. Storage:

1. Store products at site to facilitate inspection and measurement of quantity or counting of units.
2. Store heavy materials away from Project structure in manner that will not endanger supporting construction.
3. Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation.
4. Maintain temperature and humidity within range required by manufacturer's instructions.
5. The Contractor shall, at his own expense, handle and haul all materials furnished by him and shall remove any of his surplus materials at the completion of the work.
6. The Contractor shall provide suitable and adequate storage for equipment and materials furnished by him that are liable to injury and shall be responsible for any loss of or damage to any equipment or materials by theft, breakage, or otherwise.
7. All excavated materials and equipment to be incorporated in the Work shall be placed so

as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such location as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

8. The Contractor shall be responsible for all damages to the work under construction during its progress and until final completion and acceptance even though partial payments have been made under the Contract.

## PART 2 -PRODUCTS

### 2.1 PRODUCT SELECTION

#### A. General Product Requirements:

1. Provide undamaged products complying with Contract Documents and, unless otherwise indicated, unused at time of installation.
2. Provide products complete with all accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.
3. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

#### B. Product Selection Procedures:

1. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience.
2. Semi-Proprietary Specification Requirements:
  - a. Where three or more products or manufacturers are named, provide one of indicated products.
  - b. Where products or manufacturers are specified by name, it is inferred terms "or equal," or "or approved equal," are included in compliance with M.G.L. Chapter 30, 39M; comply with Section 01500 concerning "substitutions" for "or equal," or "or approved equal," to obtain approval for use of unnamed product; substitutions will be processed as Change Order Requests.
3. Performance Specification Requirements:
  - a. Where Specifications require compliance with performance requirements, provide products complying with these requirements, and are recommended by manufacturer for application indicated.
  - b. General overall performance of product is implied where product is specified for specific application.
  - c. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.
4. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with imposed code, standard, or regulation, select product complying with standards, codes, or regulations specified.
5. Visual Matching:
  - a. Where Specifications require matching established sample, Engineer's decision will be final on whether proposed product matches satisfactorily.
  - b. Where no product available within specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of Contract Documents concerning "substitutions" for selection of matching product

- in another product category, or for noncompliance with specified requirements.
6. Visual Selection:
    - a. Engineer will select color, pattern, and texture from product line selected.

### PART 3 -EXECUTION

#### 3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in applications indicated.
- B. Anchor each product securely in space, accurately located, and aligned with other work.
- C. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 01730EXECUTION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Installation of the Work.
3. Cutting and patching.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

B. Related Sections:

1. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

## 1.3 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the buildings aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

## 1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged



during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

## PART 2 -PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Engineer for the visual and functional performance of in-place materials.

## PART 3 -EXECUTION

### 3.1 EXAMINATION

- A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Structures and Utility Information:
  - 1. Furnish information to local utility that is necessary to adjust, move, or relocate existing utility lines, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
  - 2. All existing buildings, utilities, pipes, poles, wires fences, curbing, property line markers and other structures which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the contractor. Should such property be damaged, it shall be restored by the Contractor, at no additional cost to the Owner.
  - 3. The Contractor shall determine the location of all underground structures and utilities (including existing water services, drain lines, electrical lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by Contractor.

4. When fences interfere with the Contractor's operations, he shall remove and (unless otherwise specified) promptly restore.

5. On paved surfaces the Contractor shall not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels which are shaped so as to cut or otherwise damage such surfaces.

6. All property damaged by the Contractor's operations shall be restored to a condition at least equal to that in which it was found immediately before work was begun. Suitable materials and methods shall be used for such restoration.

7. Restoration of existing property and structures shall be carried out as promptly as practicable and shall not be left until the end of the construction period.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Engineer according to requirements in Division 01 Section "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to layout the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Engineer promptly.

### 3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and

chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work

area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

### 3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

### 3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01730

SECTION 01740CLEANING UPPART 1 - GENERAL

## 1.01 DESCRIPTION:

The Contractor must employ at all times during the progress of his work adequate cleanup measures and safety precautions to prevent injuries to persons or damage to property. The Contractor shall immediately, upon request by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

## 1.02 RELATED WORK:

A. Section 00700 - GENERAL CONDITIONS

B. Section 01110 – ENVIRONMENTAL PROTECTION PROVISIONS

PART 2 – PRODUCTS Not applicablePART 3 – EXECUTION

## 3.01 DAILY CLEANUP:

- A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.
- B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas, which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.
- C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

## 2.02 MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

- A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

## 2.03 REMOVAL OF TEMPORARY BUILDINGS, STRUCTURES AND EQUIPMENT:

- A. On or before completion of the work, the Contractor shall, unless otherwise specifically directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools and machinery or other construction equipment furnished by him; shall remove all rubbish from any grounds which he has occupied; shall remove silt fences and hay bales used for trapping sediment; and shall leave the roads and all parts of the property and adjacent property affected by his operations in a neat and satisfactory condition.

2.04 RESTORATION OF DAMAGED PROPERTY:

- A. The Contractor shall restore or replace, when and as directed, any 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. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

END OF SECTION



SECTION 01770CLOSEOUT PROCEDURES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for Project Closeout including, but not limited to:
1. Inspection procedures.
  2. Project Record Document submittal.
  3. Operating and Maintenance Manual submittal.
  4. Submittal of Warranties.
  5. Final cleaning.
- B. Closeout requirements for specific construction activities are included in appropriate Sections in Divisions 2 through 16.

## 1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete following.
1. List exceptions in request.
  2. In Application for Payment that coincides with, or first follows, date Substantial Completion is claimed, show 100 percent Completion for portion of work claimed as Substantially Complete.
  3. Include supporting documentation for Completion as indicated in these Contract Documents and statement showing accounting of changes to Contract Sum.
  4. If 100 percent Completion cannot be shown, include list of incomplete items, value of incomplete construction, and reasons work is not complete.
  5. Advise Owner of pending insurance change-over requirements.
  6. Submit specific warranties, workmanship bonds, release of liens from material suppliers or subcontractors as work progresses, maintenance agreements, final certifications, and similar documents.
  7. Obtain and submit releases enabling Owner unrestricted use of work and access to services and utilities; include occupancy permits, operating certificates, and similar releases.
  8. Submit Record Drawings, Maintenance Manuals, Damage or Settlement Survey, Property Survey, and similar final Record information.
  9. Deliver tools, spare parts, extra stock, and similar items.
  10. Make final change-over of permanent locks and transmit keys to Owner.
  11. Advise Owner's personnel of change-over in security provisions.
  12. Complete start-up testing of systems, and instruction of Owner's operating and maintenance personnel.

13. Discontinue or change-over and remove temporary facilities from site, along with construction tools, mockups, and similar elements.
14. Complete final clean up requirements, including touch-up painting.
15. Touch-up and otherwise repair and restore marred exposed finishes.

B. Inspection Procedures:

1. On receipt of request for inspection, Engineer will either proceed with inspection or advise Contractor of unfulfilled requirements.
2. The Engineer will prepare Certificate of Substantial Completion following inspection, or advise Contractor of construction that must be completed or corrected before Certificate will be issued.
3. The Engineer will repeat inspection when requested and assured that work has been Substantially Completed.
4. Results of completed inspection will form basis of requirements for Final Acceptance.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of Final Acceptance and Final Payment, complete following.

1. List exceptions in request.
2. Submit Final Payment Request with final releases, including all releases of liens from material suppliers and subcontractors for all placed work, and supporting documentation not previously submitted and accepted.
3. Include certificates of insurance for products and completed operations where required.
4. Submit updated final statement, accounting for final additional changes to Contract Sum.
5. Submit certified copy of Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for Acceptance and list has been endorsed and dated by Engineer.
6. Submit final meter readings for utilities, measured record of stored fuel, and similar data as of date of Substantial Completion, or when Owner took possession of and responsibility for corresponding elements of work.
7. Submit consent of surety to Final Payment.
8. Submit final Liquidated Damages Settlement Statement.
9. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure:

1. The Engineer will reinspect work on receipt of notice that work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to Engineer.
2. On completion of reinspection, Engineer will prepare Certificate of Final Acceptance, or advise Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for Final Acceptance.
3. If necessary, reinspection will be repeated.

1.5 RECORD DOCUMENT SUBMITTALS

A. General:

1. Do not use Record Documents for construction purposes; protect from deterioration and loss in

secure, fire-resistive location.

2. Provide access to Record Documents for Engineer's reference during normal working hours.

#### B. Record Drawings:

1. Maintain clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings.
2. Mark set to show actual installation where installation varies substantially from work as originally shown.
3. Mark whichever drawing is most capable of showing conditions fully and accurately.
4. Where shop drawings are used, record cross-reference at corresponding location on Contract Drawings.
5. Give particular attention to concealed elements that would be difficult to measure and record at later date.
6. Mark Record Sets with red erasable pencil; use other colors to distinguish between variations in separate categories of work.
7. Mark new information that is important to Owner, but was not shown on Contract Drawings or Shop Drawings.
8. Note related Change Order numbers where applicable.
9. Organize Record Drawing Sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on cover of each set.

#### C. Record Specifications:

1. Maintain one complete copy of Project Manual, including addenda, and one copy of other written Construction Documents such as Change Orders and modifications issued in printed form during construction.
2. Mark these documents to show substantial variations in actual work performed in comparison with text of Specifications and modifications.
3. Give particular attention to substitutions, selection of options, and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
4. Note related Record Drawing information and Product Data.
5. On completion of work, submit Record Specifications to Engineer for Owner's records.

#### D. Record Product Data:

1. Maintain one copy of each product data submittal.
2. Mark these documents to show significant variations in actual work performed in comparison with information submitted.
3. Include variations in products delivered to site and from manufacturer's installation instructions and recommendations.
4. Give particular attention to concealed products and portions of work that cannot otherwise be readily discerned later by direct observation.
5. Note related Change Orders and mark-up of Record Drawings and Specifications.
6. On completion of mark-up, submit complete set of Record Product Data to Engineer for Owner's records.

#### E. Record Sample Submittal:

1. Immediately before date or dates of Substantial Completion, Contractor will meet at site with Engineer and Owner's personnel to determine which of submitted Samples that have been

- maintained during progress of work, are to be transmitted to Owner for record purposes.
2. Comply with delivery to Owner's sample storage area.

F. Miscellaneous Record Submittals:

1. Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of work.
2. Immediately before date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference.
3. Submit to Engineer for Owner's records.

G. Maintenance Manuals:

1. Organize operating and maintenance data into suitable sets of manageable size.
2. Bind properly indexed data in individual heavy-duty 2 in., 3-ring vinyl-covered binders, with pocket folders for folded sheet information.
3. Mark appropriate identification on front and spine of each binder.
4. Include following type of information:
  - a. Emergency instructions.
  - b. Spare parts list.
  - c. Copies of warranties.
  - d. Recommended turn-around cycles.
  - e. Inspection procedures.
  - f. Shop drawings and product data.

PART 2 -PRODUCTS

Not Used

PART 3 -EXECUTION

3.1 FINAL CLEANING

A. General: General Cleaning during construction is required by General Conditions and is included in Section 01500.

B. Cleaning:

1. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program.
2. Comply with manufacturer's instructions.
3. Complete following cleaning operations before requesting inspection for Certificate of Substantial Completion.
  - a. Remove labels that are not permanent labels.
  - b. Clean exposed exterior hard-surfaced finishes to dust-free condition, free of stains, films, and similar foreign substances.
  - c. Wipe surfaces of mechanical and electrical equipment.
  - d. Clean site, including landscape development areas, of rubbish, litter, and other foreign substances.
  - e. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits.
  - f. Rake grounds that are neither paved nor planted, to smooth even-textured surface.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of work during construction.

D. Compliance:

1. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
2. Do not burn waste materials.
3. Do not bury debris or excess materials on Owner's property.
4. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
5. Remove waste materials from site and dispose of in lawful manner.
6. Where extra materials of value remaining after completion of associated work have become Owner's property, arrange for disposition of these materials as directed.

END OF SECTION

SECTION 01782OPERATION AND MAINTENANCE DATA

## PART 1 -GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing maintenance manuals, including the following:
1. Maintenance documentation directory.
  2. Emergency manuals.
  3. Product maintenance manuals.
  4. Systems and equipment maintenance manuals.
- B. Related Sections:
1. Divisions 2 through 32 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

## 1.3 CLOSEOUT SUBMITTALS

- A. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Engineer.
  - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
  - b. Enable inserted reviewer comments on draft submittals.
2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Engineer will return two copies.

- B. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion. Engineer will return copy with comments.

1. Correct or modify each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.

## PART 2 -PRODUCTS

## 2.1 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

## 2.2 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - a. Standard maintenance instructions and bulletins.
  - b. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - c. Identification and nomenclature of parts and components.

d. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

- a. Test and inspection instructions.
- b. Troubleshooting guide.
- c. Precautions against improper maintenance.
- d. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- e. Aligning, adjusting, and checking instructions.
- f. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

## PART 3 -EXECUTION

### 3.1 MANUAL PREPARATION

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.

D. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION



SECTION 01783PROJECT RECORD DOCUMENTS

## PART 1 -GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Sections:

1. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Divisions 2 through 32 Sections for specific requirements for project record documents of the Work in those Sections.

## 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:
  - a. Initial Submittal: Submit one paper copy set of marked-up record prints and one set(s) of plots from corrected record digital data files. Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
  - b. Final Submittal: Submit one paper copy set of marked-up record prints, one set(s) of record digital data files, and three set(s) of record digital data file plots. Plot each drawing file, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

- C. Record Product Data: Submit one paper copy of each submittal.

## PART 2 -PRODUCTS

## 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and

### Shop Drawings.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Record data as soon as possible after obtaining it.
    - c. Record and check the markup before enclosing concealed installations.
  2. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
  3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Engineer.
    - e. Name of Contractor.
- C. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:
1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
  2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to Engineer for resolution.
  4. Engineer will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.
    - a. Engineer makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract

modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy.

## 2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as paper copy.

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as paper copy.

## PART 3 -EXECUTION

### 3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

END OF SECTION

SECTION 02200EARTHWORKPART 1 - GENERAL1.1 DESCRIPTION

- A. The Work described by this Section consists of all earthwork encountered and necessary for construction of the project as indicated in the Contract Documents, and includes but is not limited to the following:
  - 1. Excavation
  - 2. Backfilling and Filling
  - 3. Compaction
  - 4. Embankment Construction
  - 5. Grading
  - 6. Providing soil material as necessary
  - 7. Disposal of excess suitable material and unsuitable materials
- B. Related Work Specified Elsewhere: (When Applicable)
  - 1. Traffic Regulation is specified in Division 1.
  - 2. Clearing and Grubbing, Dewatering, Loam and Seed, and Paving are specified in the appropriate sections of this Division.
  - 3. Section 01200 - Project Submittals, Meetings, and Quality Control.
  - 4. Pipe, fittings and valves are specified in Division 2.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
  - 1. All work shall be performed and completed in accordance with all local, state and federal regulations.
  - 2. The General Contractor shall secure all other necessary permits unless otherwise indicated from, and furnish proof of acceptance by, the municipal and state departments having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.
- B. Line and Grade:
  - 1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the work.
- C. Testing Methods:
  - 1. Gradation Analysis: Where a gradation is specified the testing shall be in accordance with ASTM C-117-90 and ASTM C-136-93 (or latest revision).
  - 2. Compaction Control -
    - a) Unless otherwise indicated, wherever a percentage of compaction for backfill is indicated or specified, it shall be the in-place density divided by the maximum density and multiplied by 100. The maximum density shall be the density at optimum moisture as determined by ASTM Standard Methods of Test for Moisture-Density Relations of Soil Using 10-lb. Hammer and 18-in. Drop, Designation D-1557-91 (Modified Proctor), or latest revision, unless otherwise indicated.
    - b) The in-place density shall be determined in accordance with ASTM Standard Method of Test for Density of Soil in Place by the Sand Cone method, Designation D 1556-90, (or latest revision) or Nuclear method Designation D2922.

- c) Wherever specifically indicated, maximum density at optimum moisture may be determined by ASTM Standard Methods of Test for Moisture Density Relations of Soils, ASTM D-698-91 (Standard Proctor).
- d) An Independent Testing Laboratory will be retained by the Contractor to conduct all laboratory and field soil sampling and testing, and to observe earth work and foundation construction activities. Laboratory testing will consist of sieve analyses, natural water content determinations, and compaction tests. Field testing will consist of in-place field density tests and determination of water contents.

### 1.3 SUBMITTALS

- A. Collection of samples and testing of all materials for submittals shall be performed by the Independent Testing Laboratory and paid for by the Contractor until the materials are approved by the Owner or Engineer.
- B. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.
- C. Submit test results (including gradation analysis) and source location for all borrow material to be used at least 10 working days prior to its use on the site. Contractor shall identify and provide access to borrow sites.
- D. Submit moisture density curve for each type of soil (on site or borrow material) to be used for embankment construction or fill beneath structures or pavement.

### 1.4 TESTS

The Independent Testing Laboratory shall conform to the following procedures and standards:

- A. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.
- B. All testing shall be performed by a qualified Independent Testing Laboratory acceptable to the Engineer and Contractor at the Contractor's expense unless otherwise indicated (see Section 01200 - Project Submittals, Meetings, and Quality Control).
- D. Trenches: Field density test in trenches shall be taken at 100 linear foot intervals on every third lift.
- E. In addition to the above tests the Independent Testing Laboratory will perform additional density tests at locations and times requested by the Engineer.
- F. Additional density testing will be required by the Engineer if the Engineer is not satisfied with the apparent results of the Contractor's compaction operation.
  - 1. If the test results fail to meet the requirements of these specifications, the Contractor shall undertake whatever action is necessary, at no additional cost to the Owner, to obtain the required compaction. The cost of retesting will be paid by Contractor. No allowance will be considered for delays in the performance of the work.

### 1.5 JOB CONDITIONS

- A. Site Information:
  - 1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between available soil borings. It is expressly understood that Owner and Engineer will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. Data are made available for the convenience of Contractor.

2. Additional test borings and other exploratory operations may be made by Contractor at no additional cost to Owner.
- B. Existing Utilities and Structures:
  1. The locations of utilities and structures shown on the Drawings are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warranties that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities or structures within the project area.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

- A. Topsoil: Friable, fertile, natural, free-draining loam typical of the locality; free of subsoil, roots, grass, sticks, weeds, clay, sod lumps, debris and stones larger than one (1) inch in maximum dimension. Soil shall not be excessively acid or alkaline, nor contain toxic material harmful to plant growth.
- B. Unsuitable Material: Cut or broken pavement, debris, concrete or other rubble, organic materials; muck, peat, silty soils or clayey soil; rock over six (6) inches in maximum dimension; or any material which in the opinion of the ENGINEER will not provide sufficient support or maintain the completed construction in a stable condition.

2.2 COMMON FILL MATERIALS

- A. Subsoil: Material excavated on site which is friable, natural soil composed of gravel, sand, or silty or clayey gravel and sand; free from debris, concrete or other rubble, organic matter, muck, peat, excavated rock and boulders over 6 inches in maximum dimension.
- B. Additional Fill: Imported material which is friable, natural soil composed of gravel, sand, or silty or clayey gravel and sand; free from debris, concrete or other rubble, organic matter, muck, peat, excavated rock and boulders of 6 inches in maximum dimension.

2.3 SELECT FILL MATERIALS

- A. Gravel Borrow: Material excavated from a suitable gravel bank and consisting of stones, rock fragments and fine durable particles resulting from natural disintegration of rock; meeting the following limits when tested in accordance with ASTM C136:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieves</u>
(Maximum size - 3 inches)	
2-inch	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-10

- B. Sand: Clean, hard durable grains; free from silt, topsoil, clay and organic matter; uniformly graded from coarse to fine meeting the following limits when tested in accordance with ASTM C136:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
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No. 4	100
No.100	0-30
No.200	0-12

- C. Sand Borrow: Sand borrow shall consist of clean, inert, hard, durable grains of quartz or other hard durable rock, free from loam or clay, surface coatings and deleterious materials. The allowable amount of material passing a No. 200 sieve as determined by AASHTO-T11 shall not exceed 10% by weight.

The maximum particle size for sand borrow shall be as follows:

Type a	1/4-inch
Type b	3/8-inch

- D. Crushed Stone: Clean, hard crushed stone or gravel; free from silt, topsoil, clay, and organic matter; uniformly graded from coarse to fine within the following limits when tested in accordance with ASTM C136:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
2-inch	100
1-1/2-inch	95-100
1-inch	35-70
3/4-inch	0-25

- E. Processed Gravel (Structural Fill): Clean, free-draining granular material; free from silt, topsoil, clay, and organic matter; meeting the following limits when tested in accordance with ASTM C136 and Massachusetts DPW specification M1.03.0 Type B:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
3-inch	100
1-1/2-inch	70-100
1/4-inch	50-85
No. 4	30-60
No. 200	0-10

- F. Dense-graded Crushed Stone for Subbase: Clean mineral aggregate meeting the following limits when tested in accordance with ASTM C136:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
2-inch	100
1-1/2-inch	70-100
3/4-inch	50-80
No. 4	30-55
No. 50	8-24
No. 200	3-10

- G. Impervious fill shall be well graded glacial till type material conforming to the following gradation requirements when tested in accordance with ASTM C136:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
4-inch	100
1-inch	80-100
No. 4	55-90
No. 20	35-80
No. 200	35 minimum

The material shall have a coefficient of permeability of less than  $5 \times 10^{-6}$  cm/sec when compacted to 90% maximum density at optimum moisture determined in accordance with ASTM D1557 (Modified proctor).

- H. Dumped Riprap: Hard, durable, blasted angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos); least dimension of the stone shall be greater than 1/3 of the longest dimension. Rounded stone or boulders will not be acceptable unless authorized by special provisions. The stone shall be free from overburden, spoil, shale, and organic material and shall meet the following gradation requirements:

<u>Size of Stone</u>	<u>Maximum Percent of Total Weight Smaller Than Given Size</u>
400 lbs	100
300 lbs	80
200 lbs	50
25 lbs*	10

\* No more than 5% by weight shall pass a 2-inch sieve.

Each load of riprap shall be reasonably well graded from smallest to maximum size stone so as to form a compact mass when in place. Stones smaller than the specified 10% size and spalls will not be permitted in an amount exceeding 10% by weight of each load.



- I. Structural Fill (Granular): Clean, free-draining granular material; free from silt, topsoil, clay, and organic matter; meeting the following limits when tested in accordance with ASTM C136 and Massachusetts DPW specification M1.03.0 Type B:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
3-inch	100
1/2-inch	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-10

2.4 CONCRETE

- A. If concrete is required for excess excavation, provide 3,000 psi concrete complying with requirements of Section 03300.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which excavating, backfilling, filling, compaction and grading are to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

- A. General:
1. Excavation consists of removal and disposal of all material encountered when establishing line and grade elevations required for execution of the work.
  2. The Contractor shall make excavations in such manner and to such widths as will give suitable room for building the structures or laying and jointing piping; shall furnish and place all sheeting, bracing, and supports; shall do all cofferdamming, pumping, and draining; and shall render the bottom of the excavations firm, dry and acceptable in all respects.
  3. All excavation shall be classified as either earth or ledge.
    - a) Earth Excavation shall consist of the removal, hauling and disposal of all earth materials encountered during excavation including but not limited to native soil or fill, pavement (bituminous or concrete), existing sewers and manholes, ashes, loam, clay, swamp muck, debris, soft or disintegrated rock or hard pan which can be removed with a backhoe, or a combination of such materials, and boulders measuring less than one cubic yard.
    - b) Ledge Excavation: Shall consist of the removal, hauling, and disposal of all ledge or rock encountered during excavation. "Ledge" and "rock" shall be defined as any natural compound, natural mixture that in the opinion of the Engineer can be removed from its existing position and state only by drilling and blasting, wedging, sledging, boring or breaking up with power operated tools. No boulder, ledge, slab, or other single piece of excavated material less than two cubic yards in total volume shall be considered to be rock unless, in

- the opinion of the Engineer it must be removed from its existing position by one of the methods mentioned above.
4. The Contractor shall not have any right of property in any materials taken from any excavation. Do not remove any such materials from the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be unsuitable for backfilling. The Contractor shall dispose of unsuitable and excess material in accordance with the applicable sections of the Contract Documents.
- B. Additional Excavation: When excavation has reached required subgrade elevations, notify the Engineer and Resident Project Representative who will observe the conditions.
1. If material unsuitable for the structure or paved area or pipeline (in the opinion of the Engineer) is found at or below the grade to which excavation would normally be carried in accordance with the Drawings and/or Specifications, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted select fill, screened stone, crushed stone, or concrete as directed by the Engineer.
  2. All excavated materials designated by the Engineer as unsuitable shall become the property of the Contractor and disposed of at locations in accordance with all State and local laws and the provisions of the Contract Documents.
- C. Unauthorized Excavation: Shall consist of removal of materials beyond indicated subgrade elevations or dimensions without specific authorization of Engineer. Unauthorized excavation, as well as remedial work required by the Engineer shall be at the Contractor's expense. Remedial work required is as follows:
1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation with select fill or screened stone compacted to 95%. Provide 12" minimum select fill or screened stone directly under footings. Concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.
  2. If the bottom of a trench is excavated beyond the limits indicated, backfill the resulting void with thoroughly compacted screened stone, unless otherwise indicated.
  3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.
- D. Structural Excavation:
1. Shall consist of the removal, hauling, disposal, of all material encountered in the excavation to permit proper installation of structures.
  2. Excavations for structures shall be carried to the lines and subgrades shown on the Drawings.
  3. Excavate areas large enough to provide suitable room for building the structures.
  4. The extent of open excavation shall be controlled by prevailing conditions subject to any limits designated by the Engineer.
  5. Provide, install, and maintain sheeting and bracing as necessary to support the sides of the excavation and to prevent any movement of earth which could diminish the width of the excavation or otherwise injure the work, adjacent structures, or persons and property in accordance with all state and OSHA safety standards.
  6. Erect suitable fences around structure excavation and other dangerous locations created by the work, at no additional cost to the Owner.
  7. Exposed subgrade surfaces shall remain undisturbed, protected, and maintained as uniform, plane areas and shape to receive the foundation components of the structure.
    - a. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations

- to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
- b. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade and trim bottoms to required lines and grades to leave solid base to receive the structure.
  - c. If a structure is to be constructed within the embankment, the fill shall first be brought to a minimum of 3 feet above the base of the footing. A suitable excavation shall then be made as though the fill were undisturbed earth.
- E. Trench Excavation: Shall consist of removal, hauling and disposal of all material encountered in the excavation to the widths and depths shown on the Drawings to permit proper installation of underground utilities.
1. Excavate trenches to the uniform width shown on the Drawings sufficiently wide to provide sufficient space for installation, backfilling, and compaction. Every effort should be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
  2. Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one foot above the top of the pipe.
  3. Grade bottoms of trenches as indicated for pipe and bedding to establish the indicated slopes and invert elevations, notching under pipe joints to provide solid bearing for the entire body of the pipe, where applicable.
  4. If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least two feet above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall be excavated as though in undisturbed material.
  5. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer and storm lines and proceed upgrade.
  6. Perform excavation for force mains and water mains in a logical sequence.
  7. The extent of open excavation shall be controlled by prevailing conditions subject to any limits prescribed by the Engineer.
  8. As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the state and OSHA safety standards, as outlined in the appropriate section of this Specification.
- F. Protection of Persons, Property and Utilities:
1. Barricade open excavations occurring as part of this work and post with warning lights in compliance with local and State regulations.
  2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. Exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures that may be required.
  3. Rules and regulations governing the respective utilities shall be observed in execution of all work. Active utilities and structures shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped only with written authorization of the utility owner. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable.
  4. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no

additional expense to the Owner, to the complete satisfaction of the Engineer, the utility, the property owner, and the Owner.

- G. Use of Explosives:
  - 1. Use of explosives is not allowed unless specifically approved in writing by the Owner. At a minimum, a pre-blast survey and extensive monitoring during shall be required.
  - 2. Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.
  - 3. All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc. if it is permitted.
- H. Stability of Excavations:
  - 1. Slope sides of excavations to comply with all codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
  - 2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- I. Shoring and Bracing:
  - 1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
  - 2. Provide trench shoring and bracing to comply with local codes and authorities having jurisdiction. Refer to Specification Section 02156.
  - 3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Install shoring and bracing as excavation progresses.
- J. Material Storage:
  - 1. Stockpile excavated materials which are satisfactory for use on the work until required for backfill or fill. Place, grade and shape stockpiles for proper drainage and protect with temporary seeding or other acceptable methods to control erosion.
  - 2. Locate and retain soil materials away from edge of excavations.
  - 3. Dispose of excess soil material and waste materials as herein specified.
- K. Dewatering:
  - 1. To ensure proper conditions at all times during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdowns) with which to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations (including surface and subsurface waters).
  - 2. Excavations shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged. Refer to Specification Section 02401.
- L. Cold Weather Protection:
  - 1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.
  - 2. No frozen material shall be used as backfill or fill and no backfill shall be placed on frozen material.
- M. Separation of Surface Material:
  - 1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the work.
  - 2. Prior to excavation, existing pavement shall be cut where in the opinion of the Engineer it is necessary to prevent damage to the remaining road surface.

3. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
  4. From areas within which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the Contractor prefers not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated.
- N. Dust Control:
1. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. Refer to Specification Section 01562.
  2. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, the contractor shall furnish and spread the material, as directed.

### 3.3 BACKFILL AND FILL

#### A. General:

1. Backfilling shall consist of replacing material removed to permit installation of structures or utilities, as indicated in the Contract Documents.
2. Filling shall consist of placing material in areas to bring them up to grades indicated on the Drawings.
3. The Contractor shall provide and place all necessary backfill and fill material, in layers to the required grade elevations.
4. Backfill excavations as promptly as work permits, but not until completion of the following:
  - a. Acceptance by Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
  - b. Inspection, approval, and recording locations of underground utilities.
  - c. Removal of concrete formwork.
  - d. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Temporary sheet piling driven below bottom of structures shall be removed in manner to prevent settlement of the structure or utilities, or cut off and left in place if required.
  - e. Removal of trash and debris.
  - f. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
  - g. Density testing having results meeting requirements specified herein.
5. In general, and unless otherwise indicated, material used for backfill of trenches and excavations around structures shall be suitable excavated material which was removed in the course of making the construction excavation. Unless otherwise specified or allowed by the Engineer the backfill and fill shall be placed in layers not to exceed 8 inches in thickness.
6. All fill and backfill under structures and pavement, and adjacent to structures, shall be compacted crushed stone or select fill as specified or as indicated on the Drawings. The fill and backfill materials shall be placed in layers not exceeding 8 inches in thickness.
7. All structures (including manholes) shall be placed on a 6-inch mat of screened stone unless otherwise indicated.
8. Suitable excavated material shall meet the following requirements:
  - a. Free from large clods, silt lumps or balls of clay.
  - b. Free from stones and rock fragments with larger than 12 inch max. dimension.

- c. Free from organics, peat, etc.
- d. Free from frozen material.
- 9. If sufficient suitable excavated material is not available from the excavations, and where indicated on the Drawings, the backfill material shall be select fill or common borrow, unless otherwise indicated, as required and as directed by the Engineer.
- 10. Do not backfill with, or on, frozen materials.
- 11. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.
- 12. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet.
- 13. Do not continue backfilling until the previously placed and new materials have dried sufficiently to permit proper compaction.
- 14. The nature of the backfill materials will govern the methods best suited for their placement and compaction. Compaction methods and required percent compaction is covered in Compaction section.
- 15. Before compaction, moisten or aerate each layer as necessary to provide a water content necessary to meet the required percentage of maximum dry density for each area classification specified.
- 16. Do not allow large masses of backfill material to be dropped into the excavation in such a manner that may damage pipes and structures.
- 17. Place material in a manner that will prevent stones and lumps from becoming nested.
- 18. Completely fill all voids between stones with fine material.
- 19. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.
- 20. Deposit backfill and fill material evenly on all sides of structures to avoid unequal soil pressures.
- 21. Keep stones or rock fragments with a dimension greater than two inches at least one foot away from the pipe or structure during backfilling.
- 22. Leave sheeting in place when damage is likely to result from its withdrawal.
- 23. Completely fill voids left by the removal of sheeting with screened stone which is compacted thoroughly.
- B. Improper Backfill:
  - 1. When excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.
  - 2. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.
  - 3. Excavation, backfilling, and compacting work performed to correct improper backfilling shall be performed at no additional cost to the Owner.
- C. Ground Surface Preparation:
  - 1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, scarify or break-up sloped surface steeper than 1 vertical to 4 horizontal.
  - 2. When existing ground surface has a density less than that specified under "compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

### 3.4 COMPACTION:

#### A. General:

1. Control soil compaction during construction to provide not less than the minimum percentage of density specified for each area classification.
- B. Percentage of Maximum Density Requirements:
1. Compact soil to not less than the following percentages of maximum dry density determined in accordance with ASTM D1557 as indicated.
    - a. Structures: Compact each layer of backfill or fill material below or adjacent to structures to at least 95% of maximum dry density (ASTM D1557).
    - b. Off Traveled Way Areas: Compact each layer of backfill or fill material to at least 90% of maximum dry density (ASTM D1557).
    - c. Walkways: Compact each layer of backfill or fill material to at least 93% of maximum dry density (ASTM D1557).
    - d. Roadways, Drives and Paved Areas: Compact each layer of fill, subbase material, and base material to at least 95% of maximum dry density (ASTM D1557).
    - e. Pipes: Compact bedding material and each layer of backfill to at least 90% maximum dry density (ASTM D1557). Where backfilling with excavated material, compact to native field density.
    - f. Embankments: Compact each layer of embankment material to at least 95% of maximum dry density (ASTM D1557).
- C. Moisture Control:
1. Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, in quantities controlled to prevent free water appearing on surface during or subsequent to compaction operations.
  2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory level.
- D. Embankment Compaction:
1. After each embankment layer has been spread to the required maximum 8-inch thickness and its moisture content has been adjusted as necessary, it shall be rolled with a sufficient number of passes to obtain the required compaction. One pass is defined as the required number of successive trips which by means of sufficient overlap will insure complete coverage and uniform compaction of an entire lift. Additional passes shall not be made until the previous pass has been completed.
  2. When any section of an embankment sinks or weaves excessively under the roller or under hauling units and other equipment, it will be evident that the required degree of compaction is not being obtained and that a reduction in the moisture content is required. If at any place or time such sinking and weaving produces surface cracks which, in the judgment of the Engineer are of such character, amount, or extent to indicate an unfavorable condition, he will recommend operations on that part of the embankment to be suspended until such time as it shall have become sufficiently stabilized. The ideal condition of the embankment is that attained when the entire embankment below the surface being rolled is so firm and hard as to show only the slightest weaving and deflection as the roller passes.
  3. If the moisture content is insufficient to obtain the required compaction, the rolling shall not proceed except with the written approval of the Engineer, and in that event, additional rolling shall be done to obtain the required compaction. If the moisture content is greater than the limit specified, the material of such water content may be

removed and stockpiled for later use or the rolling shall be delayed until such time as the material has dried sufficiently so that the moisture content is within the specified limits. No adjustment in price will be made on account of any operation of the Contractor in removing and stockpiling, or in drying the materials or on account of delays occasioned thereby.

4. If because of insufficient overlap, too much or too little water, or other cause attributable to defective work, the compaction obtained over any area is less than that required, the condition shall be remedied, and if additional rollings are ordered, they will be done at no cost to the Owner. If the material itself is unsatisfactory or if additional rolling or other means fails to produce satisfactory results, the area in question shall be removed down to material of satisfactory density and the removal, replacement, and re-rolling shall be done by the Contractor, without additional compensation.
  5. Material compaction by hand-operated equipment or power-driven tampers shall be spread in layers not more than 6 inches thick. The degree of compaction obtained by these tamping operations shall be equal in every respect to that secured by the rolling operation.
- E. **Compaction Methods:** The Contractor may select any method of compaction that is suitable to compact the material to the required density.
1. **General:** Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. All voids left by the removal of sheeting shall be completely backfilled with suitable materials and thoroughly compacted.
  2. **Tamping or Rolling:** If the material is to be compacted by tamping or rolling, the material shall be deposited and spread in uniform, parallel layers not exceeding the uncompacted thicknesses specified. Before the next layer is placed, each layer shall be tamped as required so as to obtain a thoroughly compacted mass. Care shall be taken that the material close to the excavation side slopes, as well as in all other portions of the fill area, is thoroughly compacted. When the excavation width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe or structure, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping or rolling, the rate at which backfilling material is deposited shall not exceed that permitted by the facilities for its spreading, leveling, and compacting as furnished by the Contractor.
- F. **Reconditioning Compacted Areas:** Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

### 3.5 GRADING:

- A. **General:**
1. Grading shall consist of that work necessary to bring all areas to the final grades.
  2. Uniformly grade areas within limits of work requiring grading, including adjacent transition areas.
  3. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. **Grading Outside Building Lines:**



1. Grade areas adjacent to building to drain away from structures and to prevent ponding.
2. Grade surfaces to be free from irregular surface changes, and as follows:
  - a. Lawn or Unpaved Areas: Finish grade areas to receive topsoil to within not more than 1" above or below the required subgrade elevations.
  - b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 1/2" above or below the required subgrade elevation.
  - c. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 3/8" above or below the required subgrade elevation.
- C. Grading Surface of Fill Under Building Slabs:
  1. Grade surface to be smooth and even, free of voids, and compacted as specified, to the required elevation.
  2. Provide final grades within a tolerance of 1/2" when tested with a 10' straight edge.
- D. Compaction:
  1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.
- E. Protection of Graded Areas:
  1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
  2. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

### 3.6 BASE COURSE AND LEVELING COURSE

- A. General:
  1. Base course consists of placing the specified materials in layers to support a leveling course or paved surface, as indicated in the Drawings.
- B. Grade Control:
  1. During construction, maintain lines and grades including crown and cross-slope of base course and leveling course.
- C. Placing:
  1. Place base course on prepared subbase conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting base materials.
  2. Place leveling course on prepared base course, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compaction.
- D. Shaping and Compacting:
  1. All layers of aggregate base course and leveling course shall be compacted to the required density immediately after placing. As soon as the compaction of any layer has been completed, the next layer shall be placed.
  2. The Contractor shall bear full responsibility for and make all necessary repairs to the base leveling courses and the subgrade until the full depth of the base leveling courses is placed and compacted. Repairs shall be made at no additional cost to the Owner.
  3. If the top of any layer of the aggregate base or leveling course becomes contaminated by degradation of the aggregate or addition of foreign materials, the contaminated material shall be removed and replaced with the specified material at the Contractor's expense.

END OF SECTION

SECTION 02230CLEARING AND GRUBBINGPART 1 - GENERAL

## 1.01 WORK INCLUDED:

- A. The Contractor shall do all required clearing and grubbing as indicated on the drawings or herein specified in the area required for construction operations on the Owner's land or in the Owner's permanent or temporary easements and shall remove all debris resulting therefrom.
- B. Unless otherwise noted, all areas to be cleared shall also be grubbed.
- C. The Contractor shall not clear and grub outside of the area required for construction operations.

PART 2 - PRODUCTS: NOT APPLICABLEPART 3 - EXECUTION

## 3.01 RIGHT TO WOOD AND LOGS:

- A. The Owner shall have the right to cut and remove logs and other wood of value in advance of the Contractor's operations. All remaining logs and other wood to be removed in the course of clearing shall become the property of the Contractor.

## 3.02 CLEARING:

- A. Unless otherwise indicated, the Contractor shall cut or otherwise remove all trees, saplings, brush and vines, windfalls, logs and trees lying on the ground, dead trees and stubs more than 1-foot high above the ground surface (but not their stumps), trees which have been partially uprooted by natural or other causes (including their stumps), and other vegetable matter such as shags, sawdust, bark, refuse, and similar materials.
- B. The Contractor shall not remove trees 1-inches or greater DBH.
- C. Except where clearing is done by uprooting with machinery or where stumps are left longer to facilitate subsequent grubbing operations, trees, stumps, and stubs to be cleared shall be cut as close to the ground as practicable but not more than 6-inches above the ground surface in the case of small trees, and 12-inches in the case of large trees. Saplings, brush and vines shall be cut close to the ground.

## 3.03 GRUBBING:

- A. Unless otherwise indicated, the Contractor shall completely remove all stumps and roots to a depth of 18-inches, or if the Contractor elects to grind the stumps, they shall be ground to a minimum depth of 6-inches.

- B. Any depression remaining from the removal of a stump and not filled in by backfilling shall be filled with gravel borrow and/or loam, whichever is appropriate to the proposed ground surface.

3.04 DISPOSAL:

- A. All material collected in the course of the clearing and grubbing, which is not to remain, shall be disposed of in a satisfactory manner away from the site or as otherwise approved. Such disposal shall be carried on as promptly as possible and shall not be left until the final clean-up period.

END OF SECTION

SECTION 02240DEWATERINGPART 1 - GENERAL

## 1.01 WORK INCLUDED:

- A. This section specifies designing, furnishing, installing, maintaining, operating and removing temporary dewatering systems as required to lower and control water levels and hydrostatic pressures during construction; disposing of pumped water; constructing, maintaining, observing and, except where indicated or required to remain in place, removing of equipment and instrumentation for control of the system.
- B. The Contractor shall pump groundwater, if encountered, during excavation operations, and water that collects or ponds due to dust control or storm events, to an on-site fractionation tank for discharge to the ground through a sediment dewatering pad(s) as described herein at a location approved by the Engineer during dry conditions.

## 1.02 RELATED WORK:

- A. Section 01110 - ENVIRONMENTAL PROTECTION PROCEDURES
- B. Section 02200 - EARTHWORK
- C. Section 02252 - SUPPORT OF EXCAVATION

## 1.03 SYSTEM DESCRIPTION:

- A. Dewatering includes lowering the water table and intercepting seepage that would otherwise emerge from the slopes or bottom of the excavation; increasing the stability of excavated slopes; preventing loss of material from beneath the slopes or bottom of the excavation; reducing lateral loads on sheeting and bracing; improving the excavation and hauling characteristics of sandy soil; preventing rupture or heaving of the bottom of any excavation; and disposing of pumped water.
- B. The Contractor shall be required to temporarily store pumped water (large fractionation tank or multiple smaller fractionation tanks) in order to discharge pumped water to the ground through a sediment dewatering pad(s) during dry conditions. See the Contract Drawings for the sediment dewatering pad detail.
- C. The Contractor shall notify the Engineer prior to the discharge of any water from the Contractor's dewatering system. No water shall be discharged to the ground without prior approval from the Engineer.
- D. The Contractor shall remove and dispose the sediment dewatering pad and accumulated sediment from the fractionation tank(s) per applicable local, State, and Federal regulations at no extra cost to the Owner.

#### 1.04 QUALITY ASSURANCE:

- A. The Contractor is responsible for the adequacy of the dewatering systems.
- B. The dewatering systems shall be capable of effectively reducing the hydrostatic pressure and lowering the groundwater levels to a minimum of 2 feet below excavation bottom, unless otherwise required by the Engineer, so that all excavation bottoms are firm and dry.
- C. The dewatering system shall be capable of maintaining a dry and stable subgrade until the structures, pipes and appurtenances to be built therein have been completed to the extent that they will not be floated or otherwise damaged.
- D. The dewatering system and excavation support (see Section 02252 - SUPPORT OF EXCAVATION) shall be designed so that lowering of the groundwater level outside the excavation does not adversely affect adjacent structures, utilities or wells.
- E. The Contractor shall immediately notify the Engineer if suspected contaminated water or other materials are encountered during the Contractor's water handling operations. The discharge of any potentially contaminated water or other materials to the ground surface is prohibited.

#### 1.05 SUBMITTALS

- A. Contractor shall submit six copies of a plan indicating how they intend to control the discharge from any dewatering operations on the project, whether it is discharge of groundwater from excavations or stormwater runoff during the life of the project. Include details and size of fractionation tank(s) and sediment dewatering pad.

#### PART 2 - PRODUCTS: NOT APPLICABLE

#### PART 3 - EXECUTION

##### 3.01 DEWATERING OPERATIONS:

- A. All water pumped or drained from the work shall be discharged to the ground through a sediment dewatering pad(s) as shown on the Contract Drawings at a location approved by the Engineer during dry conditions. The Contractor shall size the sediment dewatering pad(s) to prevent overflow; however, the pads shall be the minimum dimensions per the Contract Drawing detail.
- B. The Contractor shall provide fractionation tank(s) of suitable size to store pumped water over several days. If additional fractionation tanks are required because of inadequate capacity to store water until dry conditions allow for discharge back into the ground, the Contractor shall provide additional fractionation tanks at no additional cost to the Owner.
- C. Dewatering facilities shall be located where they will not interfere with utilities and

construction work to be done by others.

- E. Crushed stone shall encapsulate the suction end of the pump to aid in minimizing the amount of silt discharged.
- F. For dewatering operations, pump discharges shall be into a fractionation tank. Steel baffle plates shall be used to slow water velocities to increase the contact time and allow adequate settlement of sediment prior to discharge to the ground through a sediment dewatering pad(s) at a location approved by the Engineer during dry conditions.
- G. The Contractor shall be responsible for repair of any damage caused by his dewatering operations, at no cost to the Owner.
- H. The Contractor shall clean fractionation tanks and remove and dispose of accumulated sediment from fractionation tank(s) and remove and dispose the sediment dewatering pad per applicable local, State, and Federal regulations at no extra cost to the Owner.
- I. The Contractor shall provide the Engineer a minimum of two (2) days' notice prior to discharging any water from the Contractor's dewatering system. The Engineer may order the analytical testing of water from the Contractor's dewatering system prior to discharge.
- J. If required, the Contractor shall collect and analyze samples of the water from the fractionation tanks prior to discharge. Samples shall be submitted to a laboratory certified by the Commonwealth of Massachusetts and analyzed for the following parameters:
  - a. Total Petroleum Hydrocarbons via EPA Method 1664A.
  - b. Volatile Organic Compounds via EPA Method 8260.

The Contractor shall provide the Engineer with a minimum of two (2) days' notice prior to sampling and shall not sample unless the Engineer is present to witness the collection of the samples.

END OF SECTION

SECTION 02252SUPPORT OF EXCAVATIONPART 1 - GENERAL

## 1.01 WORK INCLUDED:

- A. This section of the specification covers wood sheeting and bracing for support of excavations. The requirements of this section shall also apply, as appropriate, to other methods of excavation support and underpinning which the Contractor elects to use to complete the work.
- B. The Contractor shall furnish and place timber sheeting of the kinds and dimensions required, complying with these specifications, where indicated on the drawings or required by the Engineer.

## 1.02 RELATED WORK:

- A. Section 02200 - EARTHWORK.
- B. Section 02240 - DEWATERING.

## 1.03 QUALITY ASSURANCE:

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Massachusetts Department of Safety and Department of Labor, Division of Occupational Safety “Excavation & Trench Safety Regulation (520 CMR 14.00)” and “Rules and Regulations for the Prevention of Accidents in Construction Operations (454 CMR 10.0 et seq.).” Contractors shall be familiar with the requirements of these regulations.
- B. The excavation support system shall be of sufficient strength and be provided with adequate bracing to support all loads to which it will be subjected. The excavation support system shall be designed to prevent any movement of earth that would diminish the width of the excavation or damage or endanger adjacent structures.

PART 2 - PRODUCTS

## 2.01 MATERIALS:

- A. Timber sheeting shall be sound spruce, pine, or hemlock, planed on one side and either tongue and grooved or splined. Timber sheeting shall not be less than nominal 2-inches thick.
- B. Timber and steel used for bracing shall be of such size and strength as required in the excavation support design. Timber or steel used for bracing shall be new or undamaged used material which does not contain splices, cutouts, patches, or other alterations which would impair its integrity or strength.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Work shall not be started until all materials and equipment necessary for their construction are either on the site of the work or satisfactorily available for immediate use as required.
- B. The sheeting shall be securely and satisfactorily braced to withstand all pressures to which it may be subjected and be sufficiently tight to minimize lowering of the groundwater level outside the excavation, as required in Section 02240 DEWATERING.
- C. The sheeting shall be driven by approved means to the design elevation. No sheeting may be left so as to create a possible hazard to safety of the public or a hindrance to traffic of any kind.
- D. If boulders or very dense soils are encountered, making it impractical to drive a section to the desired depth, the section shall, as required, be cut off.
- E. The sheeting shall be left in place where indicated on the drawings or required by the Engineer in writing. At all other locations, the sheeting may be left in place or salvaged at the option of the Contractor. Steel or wood sheeting permanently left in place shall be cut off at a depth of not less than two feet below finish grade unless otherwise required.
- F. All cut-off will become the property of the Contractor and shall be removed by him from the site.
- G. Responsibility for the satisfactory construction and maintenance of the excavation support system, complete in place, shall rest with the Contractor. Any work done, including incidental construction, which is not acceptable for the intended purpose shall be either repaired or removed and reconstructed by the Contractor at his expense.
- H. The Contractor shall be solely responsible for repairing all damage associated with installation, performance, and removal of the excavation support system.

END OF SECTION



SECTION 02270TEMPORARY EROSION CONTROLPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. The work under this section shall include provision of all labor, equipment, materials and maintenance of temporary erosion control devices as specified herein, as shown on the Drawings and as directed by the Engineer.
2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices or as required to control erosion that occurs during normal construction operations.
3. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
4. Erosion control measures shall be in accordance with the Massachusetts Department of Environmental Protection's - Stormwater Management Standards - (referred to hereafter as MADEP SMS) and "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas," *Franklin, Hampden, Hampshire Conservation Districts, 2003*.
5. After awarded the Contract, prior to commencement of construction activities, the Contractor shall meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.

## B. Related Work Specified Elsewhere:

1. Earthwork is specified in appropriate sections of this Division.

## C. Design Criteria:

1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.
2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved.

1.2 SUBMITTALS

The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of the responsibility of completion of the work as specified.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Furnish and install baled hay, sand bags, mulches, mats and nettings, permanent and temporary seed, water, and filter fabrics as necessary to meet erosion control requirements.

2.2 CONSTRUCTION REQUIREMENTS

## A. Temporary Erosion Checks:

1. Temporary erosion checks shall be constructed in ditches and other locations as necessary.
2. Baled hay, sand bags or siltation fence may be used in an arrangement to fit local conditions.

- B. Temporary Berms:  
Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.
- C. Temporary Seeding:  
Areas to remain exposed for a time exceeding 3 weeks shall receive temporary seeding as indicated below:

Season	Seed	Rate
April 1 to June 1 Aug. 15 to Sept. 15	Annual Ryegrass	40 lbs/Acre
May 1 to June 30	Foxtail Millet	30 lbs/Acre
April 1 to July 1 Aug. 15 to Sept. 15	Oats	80 lbs/Acre
Aug. 15 to Oct. 15	Winter Rye	120 lbs/Acre
Nov. 1 to April 1	Mulch w/ dormant seed	80 lbs/Acre @ 50% seed rate increase

- D. Siltation fences shall consist of porous filter fabric with a wire mesh backing and shall be supported by posts as per manufacturer's recommendations. Fabric shall be approved by the Engineer.
- E. Mulch All Areas Receiving Seeding:  
Hay mulch at the rate of 90-100 lbs per 1,000 square feet or a hydro application of cellulose fiber shall be applied following seeding. A suitable binder will be used on hay mulch for wind control. Anchor mulch with: mulch netting (as per manufacturer); non asphaltic emulsion (on slopes 200 gal/acre, on level 150 gal/acre); chemical tack (as per manufacturer); or wood cellulose fiber (750 lbs/acre). On slopes greater than 3 to 1, use pick chain or equivalent (as required) for mulch anchoring. Wetting for small areas and road ditches may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.
- F. Erosion control matting for slopes and ditches shall be anchored with pegs and/or staples per manufacturer's recommendations.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Temporary Erosion Checks:
- Temporary erosion checks shall be constructed in ditches and at other locations when designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales and bags to fit local conditions.
  - Baled hay, silt fences, or sandbags, or some combination, may be used in other areas as necessary to inhibit soil erosion.
  - Siltation fence, if called for in the plans, shall be located and installed as shown.
- B. Maintenance:  
Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for

maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor as appropriate.

C. Removing and Disposing of Materials:

1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of as approved by the Engineer.
2. When removed, such devices may be reused in other locations provided they are in good condition and suitable to perform the erosion control for which they are intended.
3. When dispersed over adjacent areas, the material shall be scattered to the extent that it causes no unsightly conditions nor creates future maintenance problems.
4. Sedimentation basins, if no longer required, will be filled in, the pipe removed, the surface loamed and grass cover shall be established.

END OF SECTION

## SECTION 02324

## ROCK EXCAVATION AND DISPOSAL

PART 1 - GENERAL

## 1.01 WORK INCLUDED:

- A. The Contractor shall excavate rock, if encountered, to the lines and grades indicated on the drawings or as required, shall dispose of the excavated material, and shall furnish the required material as specified in Section 02200 - EARTHWORK for backfill in place of the excavated rock.

## 1.02 RELATED WORK:

- A. Section 02200 - EARTHWORK
- B. Section 02252 - SUPPORT OF EXCAVATION
- C. Section 03300 – CAST-IN-PLACE CONCRETE

## 1.03 EXCAVATION CLASSIFICATIONS:

- A. Earth Excavation, Unauthorized Excavation, and Additional Excavation are defined in Section 02200 – Earthwork.
- B. Rock Excavation:
  - 1. Rock excavation in trenches and footing excavations includes removal and disposal of materials and obstructions encountered which cannot be excavated with a 1.0 cubic yard (heaped) capacity, 42-inch wide bucket on medium-size track-mounted hydraulic excavator equivalent to Caterpillar Model 215, rated at not less than 90HP flywheel power and 30,000 lb. drawbar pull. Trenches and footing excavations in excess of 10-feet in width are classified as open excavation.
  - 2. Rock excavation in open excavations includes removal and disposal of materials and obstructions encountered which cannot be dislodged and excavated with modern track-mounted heavy-duty hydraulic excavating equipment without drilling or ripping. Rock excavation equipment is defined as Caterpillar Model No. 973 or No. 977K, or equivalent track-mounted loader, rated at not less than 170 HP flywheel power and developing 40,000-lb. breakout force (measured in accordance with SAE J732C).
  - 3. Determination of rock excavation classification will be made by the Engineer. Typical of materials classified as rock are boulders 3.0 cubic yards or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
  - 4. Rock payment lines (if applicable) are limited to the following:

- a. Two feet outside of concrete work for which forms are required.
- b. In footing excavations, one foot below bottom-of-footing elevation.
- c. One foot outside of the vertical walls of utility structures.
- d. In pipe trenches, depth limits shall be 6 inches below the bottom of the pipe:

Depth from Ground Surface to Invert of Pipe	Pay Width	
	(Pipe ID) 0-24"	Over 24"
0 to 12'	5'-0"	Pipe I.D. +3'-0"
12 to 20'	7'-0"	Pipe I.D. +7'-0"
Over 20'	9'-0"	Pipe I.D. +7'-0"

- e. Rock sloping across the width of trench shall have the top of rock established at the rock elevation over the centerline of the pipe.
- f. For all other site improvements not listed above, including but not limited to landscape plantings and roadways, the payment line for rock removal shall be the subgrade for installation of the earthen components of the particular site improvement.

#### 1.04 BLASTING:

A. Rock blasting shall not be conducted without prior written approval from the local authority having jurisdiction and the Engineer. The Contractor is responsible for seeking, securing, and documenting to the Engineer, appropriate permission to conduct blasting. All blasting shall comply with the provisions of this specification.

#### B. Qualifications

1. Persons responsible for blasting shall be licensed blasters in the Commonwealth of Massachusetts and shall have had acceptable experience in similar excavations in rock and controlled blasting techniques.
2. Blast monitoring shall be conducted by persons trained in the use of a seismograph and records shall be analyzed and results reported by persons familiar with analyzing and reporting the frequency content of a seismograph record.

#### C. Preblast Conditions Survey

1. Prior to start of earth/rock excavation or blasting work, engage the services of an independent professional engineer to conduct a pre-blast condition survey of existing structures and conditions within 500-ft of anticipated rock blasting.
  - a. Coordinate activities, issue notices, obtain clearances and provide photographic and secretarial assistance necessary to accomplish the survey.

- b. Give notice in writing, to the property owner and any representative of local authorities required to be present at such survey. Notify in writing the dates on which surveys are planned so that representatives are present during the examination. Provide copies of notices to the Owner and Engineer.
2. Observations shall be recorded of the existing conditions for buildings and other structures which might be affected.
  - a. The survey shall consist of a description of interior and exterior conditions. Descriptions shall locate cracks, damage or other defects existing and shall include information to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks or damage exists, or for defects too complicated to describe in words, photographs shall be taken and made part of the record.
  - b. The records of each property examined shall be signed by the representatives present and, if practicable, by the property owner, whether or not they are present at the examinations.
1. Contractor's record of the pre-blast condition survey shall consist of written documentation and photographs of the conditions identified.
2. Upon completion of all earth/rock excavation and blasting work, the Contractor shall make a similar examination of properties and structures where complaints of damage have been received or damage claims have been filed. Give notice to interested parties so that they may be present during the final examinations. Records of the final examination shall be signed and distributed as the original pre-construction survey.

#### D. Codes, Permits and Regulations

1. The Contractor shall comply with applicable laws, rules, ordinances, and regulations of the Federal, State and local governing the transportation, storage, handling, and use of explosives. All labor, materials, equipment and services necessary to make the blasting operations comply with such requirements shall be provided at no additional cost to the Owner.
2. The Contractor shall obtain and pay for permits and licenses required to complete the work of this Section.
3. In case of conflict between regulations or between regulations and Specifications, the Contractor shall comply with the strictest applicable codes, regulations or Specifications.

E. Blasting Limit Criteria - The Contractor shall use controlled blasting methods and limit the extent of blasting to prevent damage to any building, structure, utility or other feature near the site. The Contractor is solely responsible to determine the maximum vibration and air blast tolerable at each facility. However, in no case shall the following be exceeded.

1. Peak Particle Velocity (PPV) limits at ground surface at existing adjacent residential or other structures:

<u>Frequency (Hz)</u>	<u>Maximum Peak Particle Velocity (in. per sec.)</u>
Over 40	2.0
30 to 40	1.5
20 to 30	1.0
Less than 20	0.5

2. Peak Particle Velocity (PPV) limits at ground surface adjacent to new concrete:

<u>Distance from Blast to Concrete (ft.)</u>	<u>Age of Concrete (from Batch Time)</u>			
	<u>1-3 days</u>		<u>Over 7 days</u>	
	<u>Max Charge</u>	<u>Weight/Delay</u>	<u>Max Charge</u>	<u>Weight/Delay</u>
	<u>Max. PPV</u>	<u>(lb.)</u>	<u>Max. PPV</u>	<u>(lb.)</u>
	<u>(in./sec.)</u>		<u>(in./sec.)</u>	
40 to 60	2.0	4.0	3.0	7.0
80 to 100	2.0	16	3.0	25
Over 150	1.25	32	2.0	50

3. Airblast Overpressure Limit:

- a. The Contractor shall conduct all blasting activity in such a manner that the peak airblast overpressure measured at the location of the nearest above ground, occupied structure to airblast does not exceed 0.0014 psi.

E. Blasting shall not be permitted within 500-ft of locations where concrete has been placed in the preceding 24 hours. Blasting shall not be permitted within 25-ft of concrete structures until the concrete has attained the specified design strength.

F. Blast Monitoring

1. The Contractor shall monitor peak particle velocities and airblast overpressures using a minimum of two seismographs operated by personnel trained in their use. Locations shall be mutually agreed upon by the Engineer and Contractor.
2. The Engineer may direct that additional blast monitoring be performed.
3. Blast monitoring requires that time of firing be precisely known so that the seismographs can be started before firing. The Contractor shall establish a signal system which will allow records of blast vibrations to be made.

G. Blast Monitoring Instrumentation

1. Provide two (minimum) seismographs for full time use on the project during blasting which have been calibrated within the previous six months to a standard which is traceable to the National Bureau of Standards. Required characteristics of seismographs are listed below:

- a. Measure the three mutually perpendicular components of particle velocity in directions vertical, radial and perpendicular to the vibration source.
  - b. Measure and display the maximum peak particle velocity component and air blast overpressure immediately after each blast.
  - c. Furnish a permanent record of a velocity/time waveform, on a strip chart or from magnetic tape.
  - d. Have a flat velocity frequency response with a minimum broad band of 6 Hz to 150 Hz with a tolerance equal to or better than plus or minus 10 percent.
  - e. Have a low frequency omnidirectional transducer for measuring airblast overpressure with a flat frequency response within the limits of 2 Hz to 250 Hz with a tolerance equal to or better than plus or minus 10 percent.
- H. The Contractor shall cooperate with the Engineer in permitting observation of the drilling and loading procedures, as well as in providing detailed information on blasting operations.
- I. The Contractor shall be completely responsible for all damages resulting from the blasting operations and shall, as a minimum, take whatever measures are necessary to maintain peak particle velocities within the specified limits. Modifications to blasting and excavation methods required to meet these requirements shall be undertaken at no additional cost to the Owner.

#### 1.05 SUBMITTALS:

- A. At least two weeks before beginning blasting operations, the Contractor shall submit to the Engineer for record the following data:
1. At least two weeks prior to commencing drilling and blasting operations submit the following:
    - a. Sequence and schedule of blasting rounds, including the general method of developing the excavation, lift heights, etc.
    - b. Methods of matting or covering of the blast area to prevent flyrock and excessive airblast overpressure.
    - c. Written evidence of the licensing, experience and qualifications of the blasters who will be directly responsible for the blasting operations.
    - d. Name and qualifications of the person(s) responsible for design and directing the blasting. The person(s) responsible shall have a minimum of 5 years of professional experience in controlled blasting operations.
    - e. Name and qualifications of the person(s) responsible for monitoring and reporting blast vibrations and overpressures.
    - f. Details of the audible advance signal system to be employed at the job site as a means of informing workers, Engineer, Owner, all abutters and the general public that a blast is about to occur.
    - g. Listing of instrumentation proposed to monitor vibrations complete with performance specifications and user's manuals supplied by the manufacturer.
    - h. Recent calibration certificate(s) (within previous six months) for the proposed blast



- monitoring instrumentation. Calibration shall be over the required frequency response ranges specified for blast monitoring instrumentation and to a standard traceable to the National Bureau of Standards.
- i. Submit three copies of the blasting permit(s) obtained to conduct blasting on the site. Obtain and pay for all permits and licenses required to complete the work of this Section. Original permits shall be prominently displayed on the work site prior to initiating blasting operations.
  - j. Pre-blast condition survey as described above.
2. Within 24 hours following each blast, the Contractor shall submit to the Engineer, a Blast Monitoring Report. Each Blast Monitoring Report shall include the following:
- a. Report of Blast Monitoring (Exhibit A, appended).
  - b. Name of observers and data interpreters.
  - c. Permit number and expiration date.
  - d. Copy of strip chart (or other permanent record of velocity/time waveform) with calibration and monitoring record marked with the date, time and location of the blast as well as the monitoring location including type of ground.
  - e. Peak particle velocity for all components as well as resultant for all frequencies of vibrations.
  - f. Duration of motion with a velocity in excess of one thousandth of an inch per second.
  - g. Peak air blast level.
  - h. Amount and type of explosives used by weight and number of cartridges.
  - i. Total number of delays used and number of holes used for each delay.
  - j. On a diagram of the blast pattern, indicate total number and depth of holes, maximum charge per delay, maximum charge per hole, and corresponding delay number.
  - k. An evaluation of the blast indicating areas of significant over break, unusual results, and any recommended adjustments for the next blast.
1. In the event that the design round results in ground vibrations which exceed the blasting limit criteria specified, the Contractor shall immediately submit a revised blast design.
2. The Contractor shall submit to the Engineer in writing all blasting complaints received by the Contractor within 24 hours of receipt. Each blast complaint report shall include the name and address of the complainant, time received, date and time of blast complained about and a description of the circumstances which led to the complaint. Copy of Blasting Damage Complaint Form is appended (Exhibit B).
3. Review by the Engineer of material submitted by the Contractor shall not relieve the Contractor of responsibility for the accuracy, adequacy and safety of the blasting, exercising proper supervision and field judgement and producing the results within the blasting limits

required by this Specification.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 EXCAVATION:

- A. The Contractor shall excavate rock to the lines and grades indicated on the drawings, Part 1 of this section, or as required by the Engineer. The excavated rock shall be removed and disposed of by the Contractor as specified for surplus excavated materials under Section 02200 - EARTHWORK.
- B. If rock is excavated beyond the limits of payment indicated on the drawings, specified, or authorized in writing by the Engineer, the excess excavation, whether resulting from over breakage or other causes, shall be backfilled, by and at the expense of the Contractor, as specified in Section 02200 - EARTHWORK.
  - 1. If rock below grade is shattered by blasting, caused by holes drilled too deep, or too heavy charges of explosives, or any other circumstance due to blasting, and if, in the opinion of the Engineer, the shattered rock is unfit for subgrade, the rock shall be removed and the excavation refilled with thoroughly compacted Gravel Borrow at no additional cost to the Owner.

3.02 MINIMUM SAFETY PRECAUTIONS DURING BLASTING

A. Clearing the Danger Area Before Blasting

- 1. No blasting shall be permitted until all personnel and vehicles in the danger area have been removed to a place of safety. A loud, audible, warning system, devised and put in operation shall be sounded before each blast. The Contractor shall familiarize all personnel on the project, Engineer, Owner, abutters and the general public with the system. The danger area shall be patrolled before each blast to make certain that it has been completely cleared and guards shall be stationed to prevent entry until the area has been cleared by the blaster following the blast.
- B. Notify authorized representatives of all utilities which may be affected by blasting operations at least 72 hours before blasting is performed.
- C. Explosives shall be stored, handled and employed in accordance with Federal, State and local regulations.
- D. No explosives, caps, detonators or fuses shall be stored on the site during non-working hours.
- E. Blasting mats shall be used to cover all blasts in order to minimize the possibility of flyrock where sufficient soil overburden to prevent flyrock does not exist.

- F. The Contractor shall be responsible for determining any other safety requirements unique to blasting operations on this particular site so as not to endanger life, property, utility services, any existing or new construction, or any property adjacent to the site.
- G. No requirement of, or omission to require, any precautions under this Contract shall be deemed to limit or impair any responsibility or obligations assumed by the Contractor under or in connection with this Contract; and the Contractor shall at all times maintain adequate protection to safeguard the public and all persons engaged in the work and shall take such precautions as will accomplish such end, without undue interference to the public. The Contractor shall be responsible for and pay for any damage to adjacent structures, buildings, utilities and other features resulting from work executed under this Section.

### 3.03 GENERAL BLASTING PROCEDURES

- A. Blasting shall be limited to between the hours of 9:00 A.M. and 2:00 P.M., Monday through Friday, unless prior written permission is received from the Engineer to blast at other times.
- B. The Contractor shall notify the Engineer at least 72 hours before blasting operations are to commence.
- C. The Contractor shall conduct blasting operations such that damage is prevented to adjacent structures, property and work and such that peak particle velocity and overpressure levels do not exceed the maximum specified limits.
- D. The Contractor shall perform all blasting required to break or fracture large boulders and bedrock to facilitate excavation to the grades required as shown on the Drawings. Should insufficiently fractured rock be encountered during excavation, the Contractor shall remove the rock using non-explosive techniques at no additional cost to the Owner.

### 3.04 SPECIAL PERIMETER CONTROL BLASTING PROCEDURES

- A. When blasting in areas where rock cuts will be exposed at ground surface, or where rock cuts are required adjacent to and below existing and/or proposed earth support systems or other structures, care shall be taken at the excavation limits to minimize overbreak and fracturing of remaining rock. Exposed finished rock surfaces shall be shaped so as to not deviate from the proposed lines and grades indicated on the Contract Drawings by more than 12 inches at any location.

END OF SECTION

EXHIBIT A

REPORT OF BLAST MONITORING

PROJECT \_\_\_\_\_ REPORT NO. \_\_\_\_\_  
GENERAL CONTRACTOR \_\_\_\_\_ SHEET 1 of \_\_\_\_\_  
BLASTING SUBCONTRACTOR \_\_\_\_\_ DATE \_\_\_\_\_  
OBSERVER \_\_\_\_\_ TIME \_\_\_\_\_ AM PM

BLAST DATA: PROJECT AREA

BLAST LOCATION: (SHOW ON LOCATION PLAN) BOTTOM OF LIFT EL.  
MAXIMUM CHARGE WEIGHT PER DELAY \_\_\_\_\_ LBS. ON DELAY TOTAL CHARGE WEIGHT  
FOR BLAST \_\_\_\_\_ LBS.

VIBRATION AND AIRBLAST OVERPRESSURE DATA: WEATHER CONDITIONS

WIND DIRECTION

SEISMOGRAPH LOCATION (SHOW ON LOCATION PLAN) SEISMOGRAPH MAKE AND  
MODEL NO.

SERIAL NUMBER

AMPLIFIER GAIN \_\_\_\_\_ CHART FEED RATE PARTICLE VELOCITY SENSOR  
LOCATION (SHOW ON LOCATION PLAN) OVERPRESSURE SENSOR LOCATION (SHOW ON  
LOCATION PLAN) DISTANCE OF SENSORS FROM BLAST FEET

BLAST MONITORING RESULTS: PARTICLE VELOCITY COMPONENTS, INCHES/SECOND:

TRANSVERSE:

VERTICAL:

LONGITUDINAL:

PEAK PARTICLE VELOCITY \_\_\_\_\_ IN/SEC PEAK AIRBLAST OVERPRESSURE  
\_\_\_\_\_ PSI

REMARKS:

**EXHIBIT B**  
**BLASTING DAMAGE COMPLAINT FORM**

DATE, TIME AND LOCATION OF INCIDENT: \_\_\_\_\_

DESCRIPTION OF ITEM OR AREA DAMAGED: \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_ Claimant

Signed \_\_\_\_\_ Date \_\_\_\_\_  
Issuing Authority

Signed \_\_\_\_\_ Date \_\_\_\_\_  
Contractor/Blaster

\*\* Contractor/Blaster required to respond to claimant within thirty (30) day period. Failure to properly respond within thirty (30) day period would justify direct notification to Contractor/Blaster insurance carrier by Engineer.

SECTION 02485LOAMING & SEEDINGPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish, place, and test topsoil, seed, lime, and fertilizer where shown on the drawings and protect and maintain seeded areas disturbed by construction work, as directed by the Engineer.
- B. Related Work Specified Elsewhere (When Applicable): excavation and embankment, backfill, compaction, and temporary erosion control are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS AND TESTING

- A. Seed:
  - 1. Furnish the Engineer with certificates from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
  - 2. The certification shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates and certificates have been approved.
- B. Topsoil:
  - 1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished.
  - 2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
  - 3. Approval, by the Engineer, to use topsoil for the work will be dependent upon a review of the soil samples.
- C. Lime & Fertilizer:
  - 1. Furnish the Engineer with copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.
  - 2. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
  - 3. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

1.3 DELIVERY, STORAGE & HANDLING

- A. Seed:
  - 1. Furnish all seed in sealed standard containers, unless exception is granted in writing by the Engineer.
  - 2. Containers shall be labeled in accordance with the United States Department of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.
- B. Fertilizer:
  - 1. Furnish all fertilizer in unopened original containers.
  - 2. Containers shall be labeled with the manufacturer's statement of analysis.

1.4 JOB CONDITIONS

- A. Topsoil: Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading.
- B. Seeding:
  - 1. Planting Seasons: The recommended seeding time is from April 1 to September 15. The Contractor may seed at other times. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted.
  - 2. Weather Conditions:
    - a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
    - b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
    - c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Seed:
  - 1. Provide the grass seed mixture approved by the Engineer, having the following composition:
    - a. Park Mixture:
      - 50 percent Creeping Red Fesque
      - 30 percent Kentucky Bluegrass
      - 20 percent Annual Ryegrass
  - 2. Do not use seed which has become wet, moldy, or otherwise damaged in transit or during storage.
- B. Topsoil:
  - 1. Provide the quantity of topsoil necessary, in the opinion of the Engineer, to complete the work.
  - 2. Provide topsoil that is natural, friable clay-loam soil possessing the characteristics of representative soils in the vicinity which produce heavy growths of crops, grass, or other vegetation.
  - 3. Provide topsoil which is reasonably free from subsoil, brush, objectionable weeds, other litter, clay lumps, stones, stumps, roots, objects larger than 2 inches in diameter, and toxic substances which might be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.
  - 4. Obtain topsoil from naturally well drained areas.
- C. Lime:
  - 1. Provide lime which is ground limestone containing not less than 85% of total carbonate and of such fineness that 90% will pass a No. 20 sieve and 50% will pass a No. 100 sieve.
  - 2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. 100 sieve. No additional payment will be made to the Contractor for the increased quantity.
- D. Fertilizer:
  - 1. Provide a commercial fertilizer approved by the Engineer.

2. Provide fertilizer containing the following minimum percentage of nutrients by weight:
  - 10% Available phosphoric acid
  - 10% Available potash
  - 10% Available nitrogen (75% of the nitrogen shall be organic)

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Equipment:
  1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.
  2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.
- B. Soil: Perform the following work prior to the application of lime, fertilizer or seed.
  1. Scarify the subgrade to a depth of 2 inches to allow the bonding of the topsoil with the subsoil.
  2. Apply topsoil to a depth of 4 inches or as directed on areas to be seeded.
  3. Trim and rake the topsoil to true grades free from unsightly variations, humps, ridges or depressions.
  4. Remove all objectionable material and form a finely pulverized seed bed.

#### 3.2 PERFORMANCE

- A. Grading:
  1. Grade the areas to be seeded as shown on the Drawings or as directed by the Engineer.
  2. Leave all surfaces in even and properly compacted condition.
  3. Maintain grades on the areas to be seeded in true and even conditions, including any necessary repairs to previously graded areas.
- B. Placing Topsoil:
  1. Uniformly distribute and evenly spread topsoil on the designated areas.
  2. Spread the topsoil in such a manner that planting work can be performed with little additional soil preparation or tillage.
  3. Correct any irregularities in the surface resulting from topsoiling or other operations to prevent the formation of depressions where water may stand.
  4. Thoroughly till the topsoil to a depth of at least 3 inches by plowing, discing, harrowing, or other approved method until the condition of the soil is acceptable to the Engineer.
- C. Placing Fertilizer:
  1. Distribute fertilizer uniformly at a rate determined by the soils test over the areas to be seeded.
  2. Incorporate fertilizer into the soil to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.
  3. The incorporation of fertilizer may be a part of the tillage operation specified above.
  4. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.
- D. Placing Lime:
  1. Uniformly distribute lime immediately following or simultaneously with the incorporation of fertilizer.



2. Distribute lime at a rate determined from the pH test, to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.
- E. Seeding:
1. Level out any undulations or irregularities in the surface resulting from tillage, fertilizing, liming or other operations before starting seeding operations.
  2. Hydroseeding:
    - a. Hydroseeding may be performed where approved and with equipment approved by the Engineer.
    - b. Sow the seed over designated areas at a minimum rate of 5 pounds per 1000 square feet.
    - c. Seed and fertilizing materials shall be kept thoroughly agitated in order to maintain a uniform suspension within the tank of the hydroseeder.
    - d. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates.
  3. Broadcast Seeding:
    - a. Broadcast seeding may be performed by equipment approved by the Engineer.
    - b. Sow the seed uniformly over the designated areas at a rate of 5 pounds per 1,000 square feet.
    - c. Sow half the seed with the equipment moving in one direction and the remainder of the seed with the equipment moving at right angles to the first sowing.
    - d. Cover the seed to an average depth of 1/2 inch by means of a brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved devices.
    - e. Do not perform broadcast seeding work during windy weather.
- F. Compacting:
1. Seeded areas must be raked lightly after sowing unless seeding is to be directly followed by application of an approved mulch.
  2. Compact the entire area immediately after the seeding operations have been completed.
  3. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 pounds per linear foot of roller.
  4. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
  5. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust.

### 3.3 PROTECTION & MAINTENANCE

- A. Protection:
1. Protect the seeded area against traffic or other use.
  2. Erect barricades and place warning signs as needed.
- B. Maintenance:
1. Properly care for the seeded areas during the period when the grass is becoming established.
  2. The protection period shall extend for 12 months after the completion of the entire project, unless the desired cover, in the opinion of the Engineer, is established in a shorter period of time.

3.4 ACCEPTANCE

- A. At final acceptance of the project all areas shall have a close stand of grass with no weeds present and no bare spots greater than three inches (3") in diameter over greater than five percent (5%) of the overall seeded area.

END OF SECTION

SECTION 02513BITUMINOUS CONCRETE PAVINGPART 1 - GENERAL

## 1.1 DESCRIPTION

## A. Work Included:

1. Furnish all plant, labor, equipment and materials required to install bituminous concrete pavement courses, including roadways, sidewalks, driveways, temporary and permanent trench paving and restoration of pavement markings as shown on the Drawings and as specified herein.
2. Remove bituminous asphaltic and/or Portland cement pavement, and replace bituminous asphaltic pavement, base, binder courses and surface courses, including temporary pavement, within the area(s) indicated on the Drawings.
3. Keep pavement removal to a minimum width suitable for the required construction.

## B. Work Not Included: Removal and replacement of paving for the convenience of the Contractor will not be considered for payment.

## C. Related Work Specified Elsewhere:

1. Excavation, backfill, aggregate base and subbase.

## 1.2 QUALITY ASSURANCE

## A. Materials: Use only materials furnished by a bulk bituminous concrete producer regularly engaged in the production of hot mixed, hot laid bituminous concrete.

## B. Equipment: Provide, maintain and operate pavers, dump trucks, tandem, 3-wheel and pneumatic tired rollers well suited to the mixtures being placed. Provide, maintain and operate hand equipment as required. When applicable, provide, maintain and operate trimming equipment and materials.

## C. Mix Requirements, Method of Placement and Compaction: The Commonwealth of Massachusetts, Department of Transportation Standard Specifications - Highways and Bridges, hereinafter called Massachusetts D.O.T. Standards, for mixing, placing and compacting bituminous concrete surfaces are applicable to this work.

## 1.3 SUBMITTALS

## A. A certificate of compliance shall be furnished to the Engineer that the materials supplied comply with the specification requirements.

## B. Delivery slips shall be furnished with each load of mix delivered to the project. Information shall include:

1. Vehicle identification.
2. Date.
3. Project.
4. Identification of material.
5. Gross, tare and net weights.
6. Signed by the bituminous concrete producer.
7. Stamped by a licensed public weighmaster.

PART 2 - PRODUCTS

2.1 AGGREGATES:

- A. Course Aggregate & Fine Aggregate shall be in accordance with the requirements of the Massachusetts Department of Public Works Specifications, "Standard Specifications for Highways and Bridges".

2.2 BITUMINOUS MATERIAL:

- A. The bituminous material shall be viscosity graded asphalt cement AC-20 with a minimum penetration of 60, in accordance with the ASTM D-3381, Table 2. Maximum mixing temperature shall be 320 degrees F.
- B. The hot mix asphalt mix shall maintain the following Marshall value:
  - Minimum Stability - 1500 lbs.
  - Flow (.01") 8 to 16
  - Voids (%) 2 to 5

C. Manufacturing Plants:

Plants used for the preparation of bituminous mixtures shall conform to the requirements of ASTM D-995 with the following changes:

- (1) Truck Scales and Plant Scales shall have been certified within the past six (6) months from the start of production. The Engineer may require the scales to be recertified during production.
- (2) Testing Laboratory - The Contractor or Producer shall provide a laboratory adjacent to the plant for use by the Engineer. The laboratory shall have all necessary equipment to perform required tests.
- (3) The Engineer shall have, at all times, access to all parts of the plant.

2.3 BINDER COURSE:

- A. Dense Binder Course shall be Type I-1 in accordance with the Massachusetts Department of Public Works, Section 460, "Standard Specification for Highways and Bridges".

2.4 TOP COURSE:

- A. Top Course shall be Type I-1 in accordance with the Massachusetts Department of Public Works Specifications, Section 460.

2.5 TACK COAT

- A. Tack coat shall be RS-1 Emulsion.

PART 3 - EXECUTION

3.1 HAULING EQUIPMENT:

- A. Trucks used for hauling bituminous mixtures shall have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, the truck beds shall be lightly coated with the minimum amount of paraffin oil, lime solution, or other approved material. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the temperature is maintained, truck beds shall be insulated and covers shall be insulated and securely fastened.

### 3.2 BITUMINOUS PAVERS:

- A. Bituminous pavers shall be self-contained, power-propelled units with an activated screed or strike-off assembly, heated if necessary, and shall be capable of spreading and finishing courses of bituminous plant mix material which will meet the specified thickness, smoothness, and grade. Pavers used for shoulders and similar construction shall be capable of spreading and finishing courses of bituminous plant mix material in widths shown on the Contract Drawings.
- B. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with the distribution system to place the mixture uniformly in front of the screed. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. The paver shall be capable of operating at forward speeds consistent with satisfactory laying of the mixture.
- C. If an automatic grade control device is used, the paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line or surface through a system of mechanical sensors or sensor directed mechanisms or devices which will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent (%). The controls shall be capable of working in conjunction with any of the following attachments:
  - (1.) Ski-type device of not less than 30 feet (9.14m) in length or as directed by the Engineer.
  - (2.) Taut stringline (wire) set to grade.
  - (3.) Short ski or shoe.

### 3.3 ROLLERS:

- A. Rollers of the vibratory, steel wheel, or pneumatic-tired type may be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the hot mix asphalt. The number, type, and weight of rollers shall be approved by the Engineer and shall be sufficient to compact the mixture to the required density while it is still in a workable condition. The use of equipment which causes excessive crushing of the aggregate will not be permitted.

### 3.4 TRANSPORTING, SPREADING, AND FINISHING:

- A. The mixture shall be transported from the mixing plant to the point of use in vehicles conforming to the requirements of Section 3.1. Trucks shall be loaded in such a manner to minimize segregation. The Engineer may require that the trucks be loaded in three dumps. Deliveries shall

be scheduled so that spreading and rolling of all mixture prepared for one day's run can be completed during daylight, unless adequate artificial lighting is provided. Any operations requiring artificial lighting must be approved by the Engineer. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to atmospheric temperature. Immediately before placing the hot mix asphalt, the underlying course shall be cleared of all debris with power blowers, power brooms, or hand brooms as directed.

- B. The mix shall be placed at a temperature of not less than 250° F (107° C) when asphalt cement is used. Prior to hot mix asphalt placement, a tack coat shall be applied at a rate of 0.05 to 0.10 gallons per square yard over the receiving asphalt surface. Upon arrival of the delivery truck to the job site, the truck bed shall be raised to allow the mix to settle against the tailgate before the load is dumped into the paver. After dumping, the mixture shall be spread to the full width by an approved bituminous paver. It shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the bituminous mat. At all times, the hopper of the paver shall remain at least 25% full. At no time shall the conveyors be exposed. The mixture shall be placed in consecutive adjacent strips having a maximum width as possible except where edge lanes require less width to complete the area. The longitudinal joint in one layer shall offset that in the layer immediately below by at least one foot (30cm); however, the joint in the top layer shall be at the centerline of the pavement. Transverse joints in one layer shall be offset by at least two (2') feet (60cm) from transverse joint in the previous layer. Transverse joints in adjacent lanes shall be offset a minimum of ten (10') feet (3m).

### 3.5 COMPACTION:

- A. After spreading, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be rolled when the mixture has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once.
- B. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until all roller marks are eliminated, the surface is of uniform texture and true to grade and cross section, and the required field density is obtained. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened, but excessive water will not be permitted. In areas not accessible to the roller, the mixture shall be thoroughly compacted with mechanical plate compactors.
- C. Any mixture that becomes loose and broken, mixed with dirt, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.
- D. Minimum Allowable Field Compaction:
- (1.) Contractor is required to achieve a minimum of 98% compaction. The compaction value is determined by comparing the in-place pavement density against the plant Marshall density.

Should initial results indicate that the compaction is not being achieved, the Engineer may halt work until proper compaction is obtained.

- (2.) Field densities will be determined by utilizing both cores and nuclear gauge readings. Core samples for determination of the density of completed pavements shall be obtained by the Contractor at no extra cost to the Awarding Authority. The size, number, and locations of the samples will be directed by the Engineer. Samples shall be neatly cut with a saw, core drill, or other approved equipment. The Contractor shall furnish all tools, labor, and material for cutting samples and replacing the pavement with hot mix.

### 3.6 INSPECTION AND TESTING:

- A. Inspection and testing for mix conformance (plant and field), unless otherwise specified, will be paid for by the CONTRACTOR. The Contractor and/or Producer is responsible for his own quality control. The Contractor shall obtain all samples for the Engineer in locations determined by the Engineer. One test per day, per job as directed by the Engineer may be taken and tested at the expense of the contractor. Any other tests taken that day will be the at the expense of the Owner.
- B. If materials fail the testing, all retesting will be done by the Engineer at Contractor's expense.
- C. Mix will be rejected at job site and sent back to plant when temperature exceeds 320° F or falls below 250° F.
- D. After completion of final rolling, the smoothness of the course shall be tested by the Engineer; humps or depressions exceeding the specified tolerances shall be immediately corrected by removing the defective work and replacing with the new material, as directed by the Engineer. This shall be done at the Contractor's expense. The finished surfaces of asphalt courses shall not vary from the gradeline, elevations, and cross sections as predetermined by the Contractor and the Engineer by more than 1/2 inch (12.70mm). The Contractor shall correct pavement areas varying in excess of this amount by (paving and replacing) the defective work. Skim patching will not be permitted.

### 3.7 PAVEMENT MARKINGS

- A. Material, approved by the Engineer, is to be furnished and applied after the installation of permanent paving.
- B. Apply pavement markings in accordance with existing markings. Match paint color, marking dimensions, layout and other details with existing markings in the vicinity of the project.

### 3.7RAISING AND ADJUSTING CASTINGS:

- A. Existing catch basin and manhole castings and valve boxes shall be raised to the proper grade where directed by the Engineer.
- B. The method of adjusting these castings shall be as follows: Cut around catch basin or manhole castings a minimum of 8-inches from casting. Excavate and if required rebuild up to 12-inches of masonry below the bottom of the casting. Only brick meeting the requirements of ASTM C32, for grade SS, hard brick will be acceptable. Backfill with suitable material and compact to bottom of casting. Place high, early strength cement or bituminous concrete collar, as directed, to approximately 1-1/2-inches below the raised casting grade.

- C. In some areas, raising of castings may not be required. Where directed by the Engineer, castings not to be raised shall have at least 12-inches of bituminous concrete pavement chipped and removed around the casting. New bituminous concrete pavement shall be placed and compacted around such castings to approximately 1-1/2-inches below the top of the casting. The overlay course shall then be sloped down to the level of the casting.
- D. The method of raising valve boxes shall be as follows: Cut around valve box a minimum of 8-inches from valve box. Excavate as required and raise the valve box. Pour high early strength cement or bituminous concrete collar, as directed, to approximately 1-1/2-inches below the top of the valve box.
- F. Castings which need to be raised or adjusted to complete permanent curb to curb paving shall be done immediately prior to paving.

3.8 REBUILDING MANHOLES AND CATCHBASINS:

- A. In areas indicated on the drawings or as determined in the field by the Engineer, catch basins and manholes exhibiting an advanced state of deterioration greater than the 12-inch minimum required in Section 3.7 Raising and Adjusting Castings shall be rebuilt.
- B. The casting and deteriorated masonry shall be removed in a neat manner until a clean sound base is obtained upon which new clay bricks can be set to rebuild the structure.
- C. Gravel borrow shall be furnished for backfill where required when excavated material is unsuitable. The casting shall be replaced with a new casting and set to line and grade in accordance with 3.7.

END OF SECTION



SECTION 03300CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

## 1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast furnace slag, and silica fume; subject to compliance with requirements.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
  - 1. Location of construction joints is subject to approval of the Engineer.
- E. Qualification Data: For Installer, manufacturer, testing agency.
- F. Welding certificates.
- G. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Curing compounds.
  - 6. Floor and slab treatments.
  - 7. Bonding agents.
  - 8. Semi-rigid joint filler.
  - 9. Joint-filler strips.

10. Repair materials.

- H. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
  - 1. Aggregates.
- I. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- J. Field quality-control reports.
- K. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to the Owner and the Engineer, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
  - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code -Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
  - 2. ACI 117, "Specification for Tolerances for Concrete Construction and Materials."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Preinstallation Conference: Conduct conference at Project site.
  - 1. Before submitting design mixtures, review concrete design mixture and examine

procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

- a. Contractor's superintendent.
  - b. Independent testing agency responsible for concrete design mixtures.
  - c. Ready-mix concrete manufacturer.
  - d. Concrete subcontractor.
  - e. Special concrete finish subcontractor.
2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold-and hot-weather concreting procedures, curing procedures, forms and form removal limitations, shoring and reshoring procedures, vapor retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

### PART 2 -PRODUCTS

#### 2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
  2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. High-density overlay, Class 1 or better.
    - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
    - c. Structural 1, B-B or better; mill oiled and edge sealed.
    - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed

concrete surface.

## 2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed, for welded rebar.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

## 2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class I plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

## 2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I/II, gray.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

## 2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

7. Non-Set-Accelerating Corrosion-Inhibiting Admixture: ASTM C 494/C 494 M, Type C.

## 2.6 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Curing Compound:
  1. ASTM C 309
  2. AASHTO M 148

## 2.7 SEALER AND HARDENER

- A. ASTM C 309 and ASTM C1315

## 2.8 RELATED MATERIALS

- A. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

## 2.9 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
  1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

## 2.10 CONCRETE MIXTURES

- A. Proportion normal-weight concrete mixture for pavement as follows:
  1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

B. Concrete Toppings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Minimum Cementitious Materials Content: 470 lb/cu. yd.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Maximum aggregate size: 3/8 inch.
5. Air Content: Do not allow air content of trowel-finished toppings to exceed 3 percent.

## 2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.12 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## PART 3 -EXECUTION

### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
1. Class A, 1/8 inch for smooth-formed finished surfaces.
  2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
1. Install keyways, reglets, recesses, and the like, for easy removal.
  2. Do not use rust-stained steel form-facing material.

- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

#### 1.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.

#### 1.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

### 3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Locate horizontal joints in walls at underside of floors, slabs, beams, and girders and at the top of floor slabs.
  - 5. Space vertical joints in walls as indicated. Locate joints near corners and in concealed locations where possible.
  - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.



### 3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into comers.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or

chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

### 3.7 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
  1. Apply float finish to concrete topping slab.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  1. Apply a trowel finish to surfaces exposed to view.
  2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
    - a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
- D. Broom Finish: Apply a broom finish to concrete pavement slabs.
  1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

### 3.8 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as

shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

### 3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - 4. Sealer and Hardener: Apply uniformly to topping slab in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.10 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least three months. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.11 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, pop-outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment.

Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. *Cut* out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

### 3.12 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections:
1. Steel reinforcement placement.
  2. Steel reinforcement welding.
  3. Headed bolts and studs.
  4. Verification of use of required design mixture.
  5. Concrete placement, including conveying and depositing.
  6. Curing procedures and maintenance of curing temperature.
  7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional

- tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  5. Compression Test Specimens: ASTM C 31/C 31M.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
  9. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
  10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
  11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Engineer.
  12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

END OF SECTION

SECTION 05500  
MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specification covers all miscellaneous metal items required for the work, except as specified elsewhere.
- B. All miscellaneous metal work shall be fabricated as detailed or approved and shall be installed complete with all necessary anchors, anchor bolts, eye bolts, guides, bolts and other accessories.
- C. In general, site and shop fabricated items are included under this section, and factory fabricated items excluded. This section includes but is not limited to: lintels, louvers, grating, frames and covers, loose metal frames, edgings, vents, protective grilles and frames, and all other site or shop fabricated metal items not provided under Section 13121 - PRE-ENGINEERED METAL BUILDING, or otherwise excluded.

1.02 RELATED WORK:

- A. Section 03301 - CAST-IN-PLACE CONCRETE
- B. Section 09900 - PAINTING
- C. Section 13121 - PRE-ENGINEERED METAL BUILDING

1.03 QUALITY ASSURANCE:

- A. The schematic drawings show the general character and extent of the work, but do not attempt to show all methods, materials, and details of construction, fastening, etc. Supplementary parts customarily necessary to complete an item, though such parts are not definitely shown or specified, shall be included as part of the item.
- B. Details of construction of the various items shall be submitted on the shop drawings. High quality construction with a neat, finished, and workmanlike appearance will be required.
- C. The size and spacing of screws, connectors, anchors, and similar items, and the size and dimensions of metal items stated herein shall apply in general; specific sizes and spacing of fasteners and dimensions of metal items listed on the drawings shall take precedence.

- D. Items supplied hereunder which are required to be built into the concrete, masonry, etc., shall be delivered to the site at locations as directed, and as required by the overall construction schedule.
- E. Manufacturers of other products comparable in quality and type to those specified will be acceptable if satisfactory data on past performance and other required information is furnished by the Contractor, and if approved by the Engineer.
- F. Color galvanized system shall be guaranteed by manufacturer for 20 years.
- G. Contractor shall submit an affidavit to Engineer that materials used are protected from or will not be subject to galvanic action.

1.04 REFERENCES:

- A. The following standards from a part of these specifications, and indicate the minimum standards required:

American Institute of Steel construction (AISC)

AISC Spec Design, Fabrication, and Erection of Structural Steel for Buildings

American Society for Testing and Materials (ASTM)

ASTM A36 Structural Steel

ASTM A53 Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded and Seamless

ASTM A123 Zinc (Hot-Dip-Galvanized) Coatings on Iron and Steel Products

ASTM A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A239 Test for Uniformity of Coating by the Preece Test (Copper Sulfate Dip) on Zinc-Coated (Galvanized) Iron or Steel Articles

ASTM A307 Carbon Steel Externally and Internally Threaded Standard Fasteners

ASTM A366 Steel, Carbon, Cold-Rolled Sheet, Commercial Quality

ASTM A525 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements

ASTM A569 Steel Carbon (0.15 Maximum Percent) Hot-Rolled Sheet and Strip, Commercial Quality



ASTM B221 Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes

ASTM B308 Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded

ASTM C478 Precast Reinforced Concrete Manhole Sections

American Welding Society (AWS)

AWS Code Standard Code for Arc and Gas Welding in Building Construction

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

- A. Before fabricating any metalwork items, samples indicating full range of finish, color, and texture to be supplied shall be submitted to the ENGINEER for review.
- B. Shop drawings for all metalwork included in this section shall be submitted to the Engineer for review.
- C. The shop drawings shall be complete and checked, showing sizes, layout, method of assembly, fastenings, anchorage or connection with other work, finish, and coatings, etc. Shop drawings for aluminum work shall indicate alloys, temper and finish to be used.
- D. Samples of colors and finishes for items that are to be color galvanized shall be submitted to ENGINEER for selection, from manufacturer's full range. ENGINEER shall have discretion of selecting up to four colors for application to fabricated items.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. STEEL:

- 1. Materials, fabrication, and erection of miscellaneous steel sections shall conform to the applicable requirements of the AISC Specification.
- 2. Steel shapes, plates and bars shall conform to ASTM A36.
- 3. Sheet steel shall be cold-rolled or hot-rolled carbon sheet steel conforming to ASTM A366 or ASTM A569 as appropriate.
- 4. Steel pipe shall conform to ASTM A53.
- 5. Stainless steel shall be Type 304 unless otherwise indicated or specified.

B. ALUMINUM:

1. Aluminum shall be fabricated of plates, rolled or extruded shapes, sheets or castings conforming to the specific aluminum alloy and temper designation of the Aluminum Association as specified for the item.
2. Aluminum work shall be fabricated in a shop where the quality of work is of the highest standard for work of this type. All work shall be executed by mechanics skilled in the fabrication of aluminum, and shall be true to detail with sharp clean profiles, fitted with proper joints and intersections, and with finishes as specified.
3. The Contractor shall furnish the Engineer with mill certificates and a signed statement from the fabricator that all aluminum work furnished is of the proper alloys as specified.

C. FASTENERS:

1. Metalwork shall be complete, with all bolts, anchors, plates, washers, clamps, screws, studs and other such devices for proper securing and anchoring. Where positions of anchorages can be predetermined, they shall be shop-installed on the item; otherwise the material or equipment to be fastened shall be expansion bolted, toggle bolted, screwed, or otherwise fastened as shown on the drawings or called for herein.
2. Bolts and nuts for general anchorage and for miscellaneous ferrous metal assemblies and fasteners shall be galvanized, unfinished bolts conforming to ASTM A307 unless otherwise noted on the drawings.
3. Expansion bolts for use in concrete and masonry shall be of one manufacturer and shall be approved. Bolts shall be Kwik Bolt concrete anchors manufactured by Hilti Corp.; Trubolt+ manufactured by Red Head Concrete Anchoring Specialists; Wej-it manufactured by Wej-it Fastening Systems; or an approved equal product.
4. The centerline of expansion shields shall not be closer than 3 inches to the edge of any concrete or masonry in which they are placed.
5. Material for fasteners shall match or be galvanically compatible with the materials fastened. Washers, nuts and other accessories shall match the bolts.
6. Where the specific type, material, size and spacing of fasteners has not been called for on the drawings or in specifications, the fasteners proposed by the Contractor shall be reviewed by the Engineer. If, in the opinion of the Engineer, they are not in accordance with good safety practices, the contractor shall revise and resubmit appropriate fasteners.

D. MISCELLANEOUS STEEL CLIPS, ANGLES, CHANNELS AND PLATES

1. Supplemental support of overhead doors and its operating motors
  - a. Galvanized
2. Supplemental support of mechanical equipment

E. PIPE BOLLARDS:

1. Bollards (door jab guard posts) shall consist of minimum 6" outside diameter schedule 80 galvanized steel structural pipe, filled with concrete. Form concrete crown at top of bollard.

### PART 3 - EXECUTION

#### 3.01 WELDING OF STEEL:

- A. Welding of steel shall be done in accordance with the AWS Code. Welds shall be continuous along entire line of contact, except where plug or tack welding is noted. Exposed welds shall be ground smooth.

#### 3.02 WELDING OF ALUMINUM:

- A. Welding of aluminum shall be done in accordance with the AWS "Welding Aluminum" as reprinted from the Welding Handbook. Aluminum shall be fusion welded by the inert gas-shielded-arc method. Where appearance is not a factor and anodizing is not required, alloy 4043 rods may be used. For appearance match, rods shall be of an alloy similar to the alloy being welded.

#### 3.03 FABRICATION AND ERECTION:

- A. Metalwork shall be complete, with all necessary bolts, nuts, washers, anchors, plates, fastenings, and other fittings. To the extent possible, holes for attachment of blocking, clip angles, etc. shall be shop punched. Where shop punching is impracticable, holes shall be field drilled. Burned holes will not be permitted.
- B. Material shall be straight, accurately fabricated with joints neatly framed, square, and well-riveted, bolted, or welded.
- C. Metalwork to receive hardware shall have all cutouts and attachments accurately made using the hardware itself or templates where necessary.
- D. Metalwork shall be accurately set and secured in position, with lines plumb and level and surfaces flush and square, or as otherwise required to conform to the structure as shown on the drawings.
- E. Wherever possible, all metalwork shall be built into the masonry work and shall have sufficient anchors, well- fastened. Anchors shall be welded to steelwork and shall be staggered where attached to structural shapes. Metal- work impracticable to set before masonry is built shall be anchored to it with approved expansion bolts set in solid masonry units or in concrete.
- F. Miscellaneous metalwork shall be plainly marked to indicate its location in the structure.

#### 3.04 PAINTING:

- A. Ferrous metals of this section, except for galvanized or stainless steel shall be shop primed in accordance with the following:

1. Submerged service components shall be sandblasted clean in accordance with SSPC-SP-10, Near White, immediately prior to priming.
  2. Non-submerged service components shall be sandblasted clean in accordance with SSPC-SP-6, Commercial Grade, immediately prior to priming.
  3. Shop primer, except as otherwise noted, shall be one spray applied coat with dry film thickness of 3.5 to 4.5 mils of Tnemec 66 Boston Gray Primer by Tnemec Co.; or Aquapun by PPG, Inc; or approved equal.
  4. Portions of ferrous metals to be embedded in concrete or masonry shall be given a heavy brush coat of alkali resistant bituminous paint.
  5. Scratches or abrasions in the shop coat and areas at field welds, bolts, nuts and other unpainted areas shall be touched up after erection with the paint specified for the shop coat. Cold galvanized paint shall be used for touch up of galvanized surfaces. Paint shall be one of the following; Sealube Co., ZRC; Galvicon Corp., Galvicon; Stanley Chemical Div., Zinc Shield; Duncan Galvanizing Corp., ZIRP; or an approved equal.
  6. Shop and field prime paint systems shall be compatible with finish coat.
- B. Aluminum louvers shall be finished with polyvinylidene fluoride (PVDF) colored opaque fluorocarbon coating. PVDF resins shall be "Kynar 500" or "Hylar 5000", or approved equal.

END OF SECTION

SECTION 07210  
BUILDING INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Foundation wall concrete faced rigid insulation board.
- B. Spray foam insulation to be placed in cavities at intersection of new roof and new wall Construction and within door channel framing.
- C. Insulation for the following is excluded from this section of the specification: Ducts, electrical items, equipment and pipes.

1.02 RELATED WORK:

- A. Section 03300 - CAST-IN-PLACE CONCRETE
- B. Section 05500 – MISCELLANEOUS METALS
- C. Section 13121 - PRE-ENGINEERED METAL BUILDING

1.03 REFERENCES: The following standards form a part of this specification, as referenced:

American Society for Testing and Materials (ASTM)

ASTM C177 Thermal Conductivity of Materials by Means of the Guarded Hot Plate

ASTM E84 Surface Burning Characteristics of Building Materials

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

- A. Six sets of shop drawings of the materials specified herein shall be submitted to the Engineer for review.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Insulation materials shall be stored off the ground in a dry space protected from the weather. Materials shall be delivered to the job in the manufacturer's original containers, bearing the manufacturer's label identifying contents.

PART 2 - PRODUCTS

2.01 CONCRETE FACED INSULATED WALL PANELS:

- A. Perimeter Foundation Insulation: Shall be extruded polystyrene board that meets or exceeds

ASTM C 578-92 (CAN/ULC-S701) Type IV, rigid, closed cell, with integral high density skin, c/w integral 3/8" (8mm) thick latex-modified concrete facing. Board Size: 2'x4'x2 5/16" or other approved by Engineer. Edges shall have tongue and groove sides, square edge ends.

- B. Thickness of rigid insulation shall be that which will produce a long term aged R-value of 5 per inch (0.03m<sup>2</sup> K/W per mm), to ASTM C 518 .
- C. Adhesive for rigid insulation shall be compatible with materials with which it will be in contact. Adhesive shall be subject to the approval of the Engineer. Adhesive shall be that recommended by the manufacturer of the insulation, such as Armstrong Cork Company No. 536 adhesive or "Daxcel Foamstik II6D", manufactured by Dacar Chemical Company.
- D. Metal Cap Flashing: Shall be 24ga (0.61mm) galvanized steel J-channel; 2 1/4" (57mm) wide, 4" (102mm) long leg and 2 1/4" (57mm) short leg; prefinished in color selected by Engineer, or approved equal. Clips and Fasteners to be corrosion-resistant type, sized to suit application; as supplied by insulation manufacturer.

#### 2.02 RIGID PERIMETER INSULATION BOARD:

- A. Board Insulation: Extruded-polystyrene board insulation complying with ASTM C 578, Square edged of type, density, and compressive strength indicated below:
  - 1. For vertical applications, Type IV, 1.6-lb/cu. ft. minimum density and 25-psi minimum compressive strength.
  - 2. For horizontal applications, pedestrian traffic, Type VII, 2.2-lb/cu. ft. minimum density and 60-psi minimum compressive strength.
  - 3. For horizontal applications, vehicular traffic, Type V, 3-lb/cu. ft. minimum density and 100-psi minimum compressive strength.
- B. Adhesive for Bonding Insulation: Product with demonstrated capability

### PART 3 - EXECUTION

#### 3.01 INSTALLATION - GENERAL:

- A. Installation shall be in accordance with the insulation manufacturer's instructions except as modified herein and on the drawings.
- B. Work which involves adhesives shall be done in dry weather and when the temperature is above 40 degrees Fahrenheit.
- C. Surfaces to receive insulation shall be clean and dry.
- D. Form release and curing compounds which might interfere with adherence of adhesive shall be removed from concrete surfaces.

E. In general, building insulation is shown schematically or omitted on the drawings, for clarity in presenting other features of construction. The entire exterior face of the building shall be blanketed with insulation, including pilasters, beams, columns, and soffits. Insulation shall be cut to form a snug fit, filling the entire space and leaving no voids.

### 3.02 RIGID INSULATION INSTALLATION:

- A. Rigid insulation shall be installed around the perimeter of building, where slab is on grade, except as otherwise noted on the drawings.
- B. Vertical perimeter insulation shall be secured with adhesive and clips to the outer face of the foundation wall as shown on the drawings. Boards with one face asphalt coated shall be applied with the opposite face against the wall. Sufficient adhesive shall be used to secure insulation firmly in correct position until backfilling is completed. Protection board to cover perimeter insulation on vertical surfaces shall be adhered to the insulation with sufficient adhesive to hold it in position until the backfill is placed.
- C. Vertical insulation shall extend from bottom of floor slab down outer face of foundation wall to (at outer face of wall). To top of perimeter foundation wall footing.

END OF SECTION

SECTION 07531FLASHINGPART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. Metal flashing and trim
- B. Gutters and downspouts
- C. Miscellaneous sheet metalwork

## 1.02 RELATED SECTIONS

- A. Copper roofing, including related copper gutters and downspouts, is specified in Section 07 61 00 - Sheet Metal Roofing.
- B. Sheet metal ductwork for air distribution systems is specified in Section 23 31 00 - HVAC Ducts and Casings.

## 1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM):

ASTM A167	Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A653/A653M	Specification for Steel Sheet, Zinc-Coated (Galvanized) or A653M Zinc-iron Alloy Coated (Galvannealed) by the Hot-Dip Process
ASTM A924/A924M	Specifications for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B29	Specification for Refined Lead
ASTM B32	Specification for Solder Metal
ASTM B209	Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B306	Specification for Copper Drainage Tube (DWV)
ASTM B370	Specification for Copper Sheet and Strip for Building Construction

- B. Federal Specification (FS):

1. FS TT-S-230 Sealing Compound: Elastomeric Type, Single Component (For Calking, Sealing, and Glazing in Buildings and Other Structures)
2. FS TT-S-1543 Sealing Compound: Silicone Rubber Base (For Calking, Sealing and Glazing in Buildings and Other Structures)



3. FS UU-B-790 Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellent and Fire Resistant)

C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): SMACNA Architectural Sheet Metal Manual

#### 1.05 SUBMITTALS

A. General: Refer to Section 01200 for submittal requirements and procedures.

B. Shop Drawings and Product Data: Submit detailed Shop Drawings of metal flashing and sheet metalwork, including installation details. Include manufacturers' product data for materials and manufactured items.

#### 1.06 QUALITY ASSURANCE

A. Flashing and sheet metalwork shall be fabricated and installed in accordance with SMACNA Architectural Sheet Metal Manual.

B. Except where otherwise indicated, comply with minimum thickness or gage requirements as specified in SMACNA Architectural Sheet Metal Manual.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

A. Galvanized Sheet Metal: Standard galvanized steel sheet, meeting requirements of ASTM A653/A653M and ASTM A924/A924M, as applicable, with minimum zinc coating of 1.25 ounces per square foot and 0.2 percent copper bearing, and mill phosphatized for maximum paint adherence. Where sheet metal gage is not indicated, provide 24 gage.

B. Stainless Steel: Stainless steel sheet for architectural applications, meeting the requirements of ASTM A167, Type 304 or Type 316, with No. 4 finish. Where stainless steel sheet gage is not indicated, provide 26 gage.

C. Sheet Copper: Standard cold-rolled copper sheet for building construction, conforming with ASTM B370, 16 oz., 20 oz., 24 oz., or 32 oz. per square foot as indicated or required. Where copper weights are not indicated, provide 16 oz. Gutters and downspouts shall be fabricated from 24 oz. copper. Cleats shall be 32 oz. copper.

D. Copper Drainage Tube: Where downspouts are indicated as copper pipe or tube, provide DWV copper drainage tube conforming to ASTM B306. Provide for installation with standard copper, brass, or bronze fittings, as indicated, capable of being soldered. Coordinate with plumbing requirements specified under Division 15 - Mechanical.

E. Aluminum Sheet Metal: ASTM B209, 5005 or 3003-H14 aluminum alloy as appropriate, clear anodized or epoxy coated. Where aluminum sheet thickness is not indicated, provide 0.0201 inch thickness.

- F. Sheet Lead: Standard 0.062 inch thick lead sheet weighing 4 pounds per square foot, arsenical-antimonial and pig lead alloy meeting the requirements of ASTM B29. Use sheet lead or tubing for flashing of vent pipes and other penetrations of the roof.
- G. Solder: Grade A meeting requirements of ASTM B32, composed of 50 percent pig lead and 50 percent block tin, warranted pure. Flux shall be an approved brand of soldering flux for the type of metal or muriatic acid neutralized with zinc.
- H. Building Paper: Rosin sized, unsaturated paper, weighing approximately 6 pounds per 100 square feet, or a water-repellent smooth building paper meeting requirements of FS UU-B-790, Type I, Grade A.
- I. Fasteners and Accessories: Furnish anchors and fasteners, washers, straps, and accessories required for a complete and finished installation. Fasteners and accessories shall conform with the following requirements:
  - 1. Nails shall be stainless steel, hard copper, bronze, or brass. Where sheet metal is built in over roofing materials or other sheet metal, use nails or screws with 1 inch matching nonferrous washers. Screws shall be standard stainless steel, brass, or bronze wood screws, as required. Sheet metal screws shall be self-drilling, self-tapping stainless steel or tempered non-corrodible steel of proper size and length to suit conditions.
  - 2. Screw heads shall be furnished with neoprene washers.
  - 3. Straps: Straps and miscellaneous fastenings, where required, shall be stainless steel, half-hard copper, or half-hard 70-30 brass of size indicated or required. Where not indicated, provide straps of 1/16 inch thick by 1 inch wide size.
- J. Sealant: Calking or sealing compound shall be a silicone synthetic rubber elastomeric sealant which cures at normal temperature to a flexible firm rubber, tack free, in gun grade consistency. Sealant shall be specially designed for adhesion to the surfaces to which it will be applied, and shall meet or exceed the minimum requirements of FS TT-S-230 or FS TT-S-1543, as applicable.
- K. Isolating Material: Alkali-resistant bituminous paint or varnish.

## 2.02 FABRICATION AND SHOP PAINTING

- A. Form and fabricate sheet metalwork as indicated and in accordance with the approved Shop Drawings and SMACNA Architectural Sheet Metal Manual. Properly reinforce sheet metalwork as required for strength and appearance.
- B. Galvanized sheet metal surfaces which will be concealed in the finished work shall be chemically treated or etched to assure maximum paint adherence and then shop painted with one coat of an approved galvanized primer as specified in Section 05500 – Miscellaneous Metals. Finish field painting is specified in Section 09900 Painting.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Installation Standards: Install flashing and sheet metalwork as indicated and in accordance with the approved Shop Drawings and SMACNA Architectural Sheet Metal Manual.
- B. Flashing and Metal Trim: Provide flashing, counterflashing, cap flashing, metal trim, and any other fabricated items and miscellaneous sheet metalwork indicated or required to provide a complete and watertight installation.
- C. Gutters and Downspouts: Install gutters and downspouts as indicated and in accordance with the approved Shop Drawings and pertinent provisions of SMACNA Architectural Sheet Metal Manual.
- D. Work Quality:
  - 1. Sheet metalwork shall be finished straight and true, with miters and joints accurately fitted. Exposed work shall be free of dents and other defects. Corners shall be reinforced and seams made waterproof. Edges of sheet metal shall be hemmed.
  - 2. Provide for expansion and contraction in sheet metal assembly by means of expansion joints or other appropriate methods of SMACNA Architectural Sheet Metal Manual. Provide reinforcement as required.
  - 3. Isolate and protect dissimilar metals from contact with each other by applying specified isolation material to contact surfaces. Protect surfaces of sheet metal in contact with concrete, treated wood, or aluminum with a heavy coating of bituminous paint.
  - 4. Provide waterproof neoprene washers wherever required fasteners penetrate sheet metal. Exposed fasteners will not be permitted for any portion of this work.
- E. Calking and Sealing: Calk or seal joints and laps of sheet metalwork as indicated or required for a waterproof installation. Beads of sealant which will be concealed in the finished work shall be continuous with no voids of material. Interface and coordinate the calking and sealing work of this Section with the work specified in Section 07920 – Joint Sealants.
- F. Flashing for Roof Penetrations:
  - 1. Flashing of roof penetrations shall be 4 pound lead. Flashing shall be accurately formed to conform with roofing contours and configurations and as required to assure a watertight installation. Flashing shall be built in as the roofing work progresses. Flash and burn lead against any penetrations through its surface.
  - 2. Except as indicated otherwise, plumbing and mechanical vent flashing shall be of 4 pound lead tubing. Flanges shall be minimum 18 inches square, and tubing shall be long enough to permit turning lead into the end of vent pipe.

END OF SECTION

SECTION 07920

JOINT SEALANTS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers the sealing of joints designated on the drawings or specified herein, including but not limited to, concrete to concrete, structural steel to concrete, structural and any other metal surfaces butting to another metal or concrete.
- B. The above-mentioned joints shall be sealed even if not called out on the drawings.
- C. Seal beneath threshold and other items required to be set in caulking compound shall be by the trade installing the item.

1.02 RELATED WORK:

- A. Section 03300 - CAST-IN-PLACE CONCRETE
- B. Section 05500 - MISCELLANEOUS METALS
- C. Section 08100 - METAL DOORS AND FRAMES

1.03 REFERENCES:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

American Society for Testing and Materials (ASTM)

ASTM C920 Specification for Elastomeric Joint Sealant

ASTM C 1193 Standard Guide for Use of Joint Sealants

ASTM D1667 Specification for Flexible Cellular Materials – Vinyl Chloride Polymers and Copolymers (Closed-cell Foam)

United States of America Standards Institute (USA)

USA 116.1     Standard Specification for Polysulfide-Base Sealing Compounds for the Building Trade

B. When reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply.

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. Six sets of manufacturer's literature of the materials of this section shall be submitted to the Engineer for review.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Materials shall be delivered to the site in the original, unopened, factory-sealed containers, bearing the manufacturer's label fully identifying the material and the producing company.

B. Handle materials with care. Do not dump from trucks or delivery vehicles nor handle in any manner likely to cause damage.

1.06 QUALITY ASSURANCE

A. Materials shall not be applied in wet weather or to wet or damp surfaces. No work shall be performed when temperature is below 40 degrees Fahrenheit. Surfaces shall not be caulked until thirty days after completion of concrete, masonry work, or patching, whichever is later. At least three good drying days shall immediately precede application. Application shall in each case be in accordance with the instructions of the manufacturer of the material, except as modified herein.

B. Surrounding areas which are not to be coated shall be completely protected from spray, spattering, or dripping, using drop cloths or other protective measures, as required. Spillage or dripping which occurs shall be immediately and completely removed, leaving no stain. Solvents or cleaning methods shall be those recommended by the manufacturer of the material being used.

C. Furnish the service of a competent field representative of the approved manufacturer of the sealant. The field representative shall be present at the work site prior to any mixing of components to instruct on application and inspection of procedures and to inspect the finish or the prepared surfaces prior to application of the sealant. The representative shall make at least one additional visit to the site as the work progresses and shall report on each visit to the Contractor and the Engineer, advising as to whether the application is being performed in accordance with this specification and the printed instructions of the manufacturers.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. Sealants and primers for use with sealants shall be as manufactured by J.B. Fred Kuhls, Brooklyn, New York; Minwax Co., Inc., New York, New York; Dewey and Almy Chemical Division of W.R. Grace & Co., Cambridge, Massachusetts; Sonneborn Building Products, New York, New York; or an approved equal product.

## 2.02 MATERIALS

### A. SEALANTS:

1. Sealants shall be non-staining materials conforming to the requirements of United States of America Standards Institute "Standard Specification for Polysulfide-Base Sealing Compounds for the Building Trade", USA 116.1. Compound shall be Class A (self-leveling), or Class B (non-sag), as applicable in each case for the joint to be caulked. Color of sealant shall match as closely as possible the color of the surrounding materials, and when used adjacent to masonry work the compound shall match the color of the mortar in the masonry joints. Precise color shall in all cases be subject to the approval of the Engineer.

### B. JOINT CLEANER:

1. Non-corrosive and non-staining type, recommended by sealant manufacturer and compatible with joint forming materials.

### C. PRIMER:

1. Primer shall be non-staining type as recommended by the manufacturer of the sealant.

### D. BACK-UP MATERIAL:

1. Back-up material for sealer shall be a non-staining type oakum, treated to prevent rot, or shall be a non-staining, compressible, closed-cell joint filler of polyvinyl chloride, neoprene vinyl, or a similar inert and permanent back-up material approved in advance by the Engineer. Back-up materials containing oil or grease and materials which are not compatible with the primers and caulking compound shall not be used. Tremco Joint Backing and Dow Corning "Ethafoam" or approved equal.

### E. BOND BREAKER

1. Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape which will satisfactorily adhere to the premolded joint filler or concrete surface as required. The tape shall be the same width as the joint.
2. Bond breaker for concrete other than where tape is specifically called for shall be either bond breaker tape or a nonstaining type bond prevention coating such as Williams Tilt-up Compound by Williams Distributors, Inc. Silcoseal 77 by Nox-Crete Incorporated or approved equal.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION:

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

#### 3.02 PREPARATION:

- A. Where recommended by the manufacturer of the sealant, primer shall be used before sealant is applied. Copper to be in contact with sealant shall be primed with five-pound cut shellac or as recommended by the sealant manufacturer, before sealant material is applied. Aluminum, stainless steel, and other materials shall have any protective film removed using a cloth dampened with Toluol, Xylol, or other suitable solvent.

#### 3.03 APPLICATION:

- A. Sealant shall be mixed and applied in accordance with the manufacturer's printed directions. No materials shall be added to the compound.
- B. Joints and spaces to be caulked shall be clean, dust-free, and dry. Mortar droppings, construction debris, and other foreign matter shall be removed from the joint before it is caulked. Raking out excess mortar in masonry and similar joints which are to be caulked shall be performed by the trade responsible for installing the mortar.
- C. The joint or space to be sealed shall be packed tight with oakum or other approved filler materials, leaving a space approximately square in cross-section, and in no case deeper than half of its width, to receive the caulking compound. Filler materials shall be sufficiently wider than the joint in which they are used to provide adequate resistance when sealant material is being gunned into the joint.
- D. Sealant shall be applied with a gun, using a nozzle of proper size to fit the joint width, and shall be forced into the joints with sufficient pressure to expel all air and fill the joint solid. Superficial pointing of joints with a skin bead will not be accepted. Sealant shall be uniformly smooth and free from wrinkles, and shall have a slightly concave joint profile when dry. Intersections of beads shall form neat miters. Sealant at edges of the joint shall be flush with the edges of the adjacent surfaces. Excess sealant material shall be removed. Improperly filled or finished joints shall be raked out and resealed.
- E. Sealant depth shall not exceed one-half of joint width.
- F. Particular care shall be taken not to soil adjacent surfaces. Spillage or excess material shall be removed immediately, leaving no stain. Masking tape shall be used as required to protect surrounding surfaces and prevent staining. Masking tape shall be removed immediately after tooling of the sealant. Adjacent surfaces soiled by operations under this section shall be cleaned

to equal their condition before the start of the caulking work.

- G. Spaces left between walls and elements of roof shall be filled with back-up material inserts and then caulked on both sides.

END OF SECTION



SECTION 08100

METAL DOORS, WINDOWS, AND FRAMES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers hollow metal doors and pressed steel door frames.
- B. Finish hardware is furnished under Section 08700 - HARDWARE for installation under this section.

1.02 RELATED WORK:

- A. Section 07920 - JOINT SEALANTS
- B. Section 08700 - HARDWARE
- C. Section 08800 - GLASS AND GLAZING
- D. Section 09900 - PAINTING

1.03 REFERENCES

- A. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

1.04 QUALITY ASSURANCE:

- A. Doors and frames so noted in door schedule shall be U.L. labeled for fire rated doors.
- B. All doors noted within the door schedule are to be insulated.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

- A. Six sets of manufacturer's literature of the materials of this section shall be submitted to the Engineer for review.

- B. Six sets of door schedules showing door sizes and types, frames sizes and types, shall be submitted to the Engineer for review.

1.06 DELIVERY AND STORAGE:

- A. Work shall be coordinated with the hardware supplier who will provide templates for mortised hardware to the door manufacturer.
- B. Materials included in this section shall be delivered in perfect condition and shall be protected from damage during storage and construction periods and until acceptance of the building.
- C. Doors shall be stored in an upright position under cover on the building site on wood sills or on floors in a manner that will prevent rust and damage.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. PRESSED METAL DOOR FRAMES:

1. Frames shall be fabricated to suit the wall type.
2. Frames shall be fabricated of 16 gauge cold rolled steel for openings up to and including 3'0" x 7'2" in size, and of 14 gauge cold rolled steel for larger openings.
3. Joints shall be die-mitered with integral tabs for reinforcement and interlocking of the jambs to the head.
4. Frames shall be set up and welded.
5. Frames shall be mortised, reinforced and drilled and tapped for all mortise finish hardware.
6. Frames shall be reinforced for surface mounted hardware, with drilling and tapping to be done in the field by the Contractor.
7. Hardware reinforcements shall be compatible to hardware specified and shall meet the following minimum requirements:
  - a. Hinge - 7 gauge x 1-5/8" x 10"
  - b. Lock Strike - 14 gauge x 1-5/8" x 4"
  - c. Closer - 12 gauge x contour of head x 16"
8. Frames shall have fixed, adjustable or stud anchors as required by wall conditions. Anchors shall be galvanized 14 gauge corrugated steel with dimensions as recommended by the manufacturer.

9. Frames at doors shall be supplied with adhesive rubber silencers, 3 on the strike jamb for single doors and 2 per head for double doors.
10. Framing for windows, transom and sidelights shall be provided with beads to accept glass. Screw holes shall be pre-drilled in both frames and bead.

**B. GALVANIZING:**

1. All doors and frames that will be exposed to the exterior shall be hot-dipped galvanized.

**C. SHOP PRIMING:**

1. All doors and frames shall receive a degreaser phosphate treatment and one baked on coat of alkyd phenolic primer.

**D. DOOR ACCESSORIES:**

1. Doors, where indicated, shall be arranged for 5/8-inch insulating glazed vision panel, with manufacturer's stock type flush glazing stop. Glass shall be furnished and installed under Section 08800 - GLASS AND GLAZING.

**PART 3 - EXECUTION**

**3.01 INSTALLATION:**

- A. Frames shall be erected plumb and true, and shall be braced during construction until the attached anchors are built into the masonry system, or until there is no danger of movement.
- B. Doors shall be fitted with hardware, accurately hung, and adjusted for proper and smooth operation.
- C. Hardware shall be mounted in accordance with the hardware manufacturer's instructions with the fasteners supplied by the hardware manufacturer.
- D. Thresholds shall be set in non-hardening caulking compound in a method approved by the threshold manufacturer. Screw holes and joints with other materials shall be sealed with caulking compound.

END OF SECTION

## SECTION 08320

### OVERHEAD SECTIONAL DOORS

#### PART 1 -GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Overhead Door Contractor to coordinate final power requirements with the Electrical Contractor prior to ordering and shipping overhead doors. Conduit and wiring and final connections to the motor disconnect are furnished and installed by the Electrical Contractor. Hand/Off/Auto switch is furnished by the Overhead Door Contractor, conduit and wiring from Hand/Off/Auto switch to motor disconnect switch to be furnished and installed by the Electrical Contractor. Furnishing of the controller and all other accessories associated with the operation of the overhead door shall be the responsibility of the Overhead Door Contractor.

##### 1.02 SUMMARY

- A. This Section includes the following types of sectional overhead doors:
  - 1. Sectional Overhead Doors with steel-framed steel panels.
    - a. Refer to Drawings for sectional overhead door sizes and locations.
  - 2. Tracks configured for the following lift types:
    - a. Lift Clearance. (High Lift)
      - 1. Head and jamb weatherstripping.
      - 2. Full vision panels.
      - 3. Electrically motor operated doors.
- B. Refer to Schedule at end of this Section.
- C. Related Sections include the following:
  - 1. Miscellaneous steel supports, steel angles at door heads and jambs: Section 05500 - Miscellaneous Metals.
  - 2. Power connections to door operation and wiring/coordination between door operator and door control station; all other wiring is by Section 08320 – Overhead Doors.

### 1.03 DEFINITIONS

- A. Operation Cycle: One complete cycle of a door begins with the door in the closed position. The door is then moved to the open position and back to the closed position.

### 1.04 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide sectional overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
1. Wind Load: Uniform pressure (velocity pressure) of 30 lbf/sq. ft. (960 Pa), acting inward and outward.
  2. Operation-Cycle Requirements: Design sectional overhead door components and operator to operate for not less than 50,000 cycles.

### 1.05 SUBMITTALS

- A. Product Data: For each type and size of sectional overhead door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
  2. Summary of forces and loads on walls and jambs.
  3. Motors: Show nameplate data and ratings; characteristics; mounting arrangements; size and location of winding termination lugs, conduit entry, and grounding lug; and coatings.
- B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.
1. Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring and between components provided by door manufacturer and those provided by others.
  2. Show all structural supports and accessories to be supplied by the General Contractor for a full and complete installation.
- C. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- D. Manufacturers' Certificates: Signed by manufacturers certifying that they comply with requirements specified in "Quality Assurance" Article. On request, submit evidence of manufacturing experience.

### 1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the sectional overhead door manufacturer for both installation and maintenance of units required for this Project.

- B. Manufacturer Qualifications: Engage a firm experienced in manufacturing sectional overhead doors similar to those indicated for this Project and with a record of successful in-service performance.
- C. Source Limitations: Obtain sectional overhead doors through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of sectional overhead doors and accessories and are based on the specific system indicated. Other manufacturers' systems with equal performance and dimensional characteristics may be considered. Refer to Division 1 Section "Substitutions."
- E. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

## PART 2 -PRODUCTS

### 2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the project include, but are not limited to:
  - 1. Overhead Door Co.
  - 2. Raynor.
  - 3. Wayne Dalton.

### 2.02 STEEL SECTIONS

- A. Construct door sections from galvanized, structural-quality carbon-steel sheets complying with ASTM A 653 (ASTM A 653M), commercial quality, with a minimum yield strength of 33,000 psi (225 MPa) and a minimum G60 (Z180) zinc coating.
  - 1. Steel Sheet Thickness: Minimum 20 gauge.
  - 2. Exterior Section Face: Pebbled or other approved.
- B. Fabricate door panels from a single sheet to provide sections not more than 24 inches (600 mm) high and nominally 2 inches (50 mm) deep. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.
  - 1. For insulated doors, provide door sections with continuous thermal-break construction, separating faces of door.
- C. Enclose open section with not less than 16 gauge galvanized steel channel end stiles welded in place. Provide not less than gauge galvanized intermediate stiles, cut to door section profile, spaced at not more than 48 inches (1200 mm) o.c., and welded in place.
- D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized steel bars, struts, trusses or strip steel, formed to depth and

bolted or welded in place.

E. Provide reinforcement for hardware attachment.

F. Insulation: Manufacturer's standard rigid cellular polystyrene or polyurethane-foamtype thermal insulation, foamed in place to completely fill inner core of section, pressure bonded to face sheets to prevent delamination under wind load and with maximum flame-spread and smoke-developed indices of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely, with no exposed insulation material evident.

1. Steel Sheet Inside Face: Minimum 0.016 inch thick.

G. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints, and free of warp, twist, and deformation.

H. Finish galvanized steel door sections as follows:

1. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
2. Pretreat zinc-coated steel, after cleaning, with a conversion coating of type suited to organic coating applied over it.
3. Apply manufacturer's standard primer and finish coats to interior and exterior door faces after forming, according to coating manufacturer's written instructions for application, thermosetting, and minimum dry film thickness.
4. Color: White.

## 2.03 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Provide manufacturer's heavy duty, hot-dipped galvanized steel track system, sized for door size and weight, designed for lift type indicated and clearances shown, and complying with ASTM A 653 (ASTM A 653M), for minimum G60 (Z180) zinc coating. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slot vertical sections of track at manufacturer required on-center for door-drop safety device. Slope tracks at proper angle from vertical or otherwise design to ensure tight closure at jambs when door unit is closed. Weld or bolt to track supports.

B. Provide High Lift Clearance as per Schedule at end of this Section.

C. Track Reinforcement and Supports: Provide galvanized steel track reinforcement and support members, complying with ASTM A 36 (ASTM A 36M) and ASTM A 123. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.

D. Support and attach tracks to opening jambs with continuous galvanized angle welded to tracks and attached to wall. Support horizontal (ceiling) tracks with continuous galvanized angle welded to track and supported by laterally braced galvanized attachments to overhead structural members at curve and end of tracks.

E. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets of

flexible vinyl, rubber, or neoprene fitted to bottom and at top of overhead door.

1. Provide motor-operated doors with combination EPDM bottom weatherseal and sensor edge.
2. In addition, provide continuous flexible seals at door jambs and head for a weathertight installation.
3. Provide PVC weatherseal between sections.

F. Full Vision Panels: Manufacturer's standard aluminum tubular frame section fully glazed with clear coat complying with ASTM C 1036, Type I, Class 1, Quality q3, tempered safety glass insulated glazing set in glazing channel with removable extruded-vinyl or aluminum stops.

1. Glazing: Minimum 1/2" insulated.

## 2.04 HARDWARE

- A. General: Provide heavy-duty, corrosion-resistant hardware, hot-dip galvanized or stainless-steel, to suit door type.
- B. Hinges: Provide heavy-duty galvanized steel hinges, of not less than 0.0747-inch-(1.9-mm-) thick uncoated steel, at each end stile, at center, and at each intermediate stile, per manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges, where required, for doors exceeding 16 feet (4.87 m) in width, unless otherwise recommended by door manufacturer.
- C. Rollers: Provide heavy-duty 10-ball bearing rollers, with steel ball bearings in casehardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide manufacturer recommended roller tires for roller track.

## 2.05 COUNTERBALANCING MECHANISM

- A. Torsion Spring: Operation by torsion-spring counterbalance mechanism consisting of adjustable-tension torsion springs, fabricated from oil-tempered-steel wire complying with ASTM A 229 (ASTM A 229M), Class II, mounted on a cross-header tube or steel shaft. Connect to door with galvanized aircraft-type lift cables with cable safety factor of at least 5 to 1. Provide springs calibrated for 50,000 cycles minimum.
1. Provide heavy duty precision-ground cast flange headplate bearings.
  2. Provide solid steel shaft.
- B. Cable Drums: Provide cast-aluminum or gray-iron casting cable drums grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide 1 additional midpoint bracket for shafts up to 16 feet (4.87 m) long and 2 additional brackets at one-third points to support shafts more than 16 feet (4.87 m) long, unless closer spacing is recommended by door manufacturer.



- C. Cable Safety Device: Include a spring-loaded, steel or bronze cam mounted to bottom door roller assembly on each side, designed to automatically stop door if either cable breaks.
- D. Bracket: Provide anchor support bracket, as required to connect stationary end of spring to the wall, to level shaft and prevent sag.
- E. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

## 2.06 MANUAL DOOR OPERATORS

- A. Push-up Operation: Provide lift handles and pull rope for raising and lowering doors, operating with not more than 25-lbf (111-N) lift or pull.

## 2.07 ELECTRIC DOOR OPERATORS

- A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operational life specified, complete with electric motor and factory pre-wired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
- B. Comply with NFPA 70.
- C. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging sprocket-chain operator and releasing brake for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- D. Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.
- E. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V, ac or dc.
- F. Door-Operator Type: Provide unit consisting of electric motor and the following:
  1. Trolley or drawbar type, with dual V-belt primary drive, chain and sprocket secondary drive, and quick disconnect-release for manual operation.
  2. Reduction: 20:1 gear reduction in worm gear.
  3. Clutch: disk type.

- G. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors, complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position, at not less than 2/3 fps (0.2 m/s) and not more than 1 fps (0.3 m/s), without exceeding nameplate ratings or considering service factor.
1. Type: 3-phase, 208 volt.
  2. Service Factor: According to NEMA MG 1, unless otherwise indicated.
  3. Coordinate wiring requirements and electrical characteristics of motors with building electrical system.
  4. Provide open drip proof-type motor, and controller with NEMA ICS 6, Type 1 enclosure.

## 2.08 DOOR CONTROL SYSTEMS

### A. Door Control Stations:

1. Provide momentary-contact, 3-button control station with push-button controls labeled "Open," "Close," and "Stop," at interior; full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure at each door location.
2. Provide complete water-resistant electrical controls in the wash bay.

### B. Obstruction Detection Devices: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

1. Sensor Edge: Provide each motorized door with an automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
  - a. Provide electrically actuated automatic bottom bar.
2. Photo electric eye.

### C. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

## PART 3 -EXECUTION

### 3.01 EXAMINATION

- A. Examine wall and overhead areas, including opening framing and blocking, with Installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work of this Section.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.
- B. Fasten vertical track assembly to framing at not less than 24 inches (600 mm) o.c. Hang horizontal track from structural overhead framing with angle or channel hangers welded and bolt fastened in

place. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

C. Wiring and controls specified in this Section and Division 16.

### 3.03 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

B. Adjust belt-driven motors as follows:

1. Use adjustable motor-mounting bases for belt-driven motors.
2. Align pulleys and install belts.
3. Tension belt according to manufacturer's written instructions.

### 3.04 DEMONSTRATION

A. Startup Services: Engage a factory-authorized service representative to perform startup services and to train Owner's maintenance personnel as specified below:

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
3. Review data in the maintenance manuals. Refer to Division 1 Section "Contract Closeout."

END OF SECTION

SECTION 08700HARDWAREPART 1 - GENERAL

## 1.01 WORK INCLUDED:

- A. This Section covers hardware for hollow metal and wood doors complete.
- B. Installation of hardware is included under the door section for which the hardware is supplied.

## 1.02 RELATED WORK:

- A. Section 08100 - METAL DOORS AND FRAMES

## 1.03 SYSTEM DESCRIPTION:

- A. Cylinder locks, including padlocks, shall be grand masterkeyed as directed by the Engineer. Cylinders shall be removable core type. Three change keys shall be furnished with each lock, and each shall have the change number stamped thereon. Six masterkeys shall be furnished for each master set furnished.
- B. Construction cores shall be installed in locks for use during construction.
- C. Adequate arrangements for providing construction security without risking the integrity of the final locks will be acceptable, subject to the prior approval of the Engineer.

## 1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

- A. Six copies of manufacturer's printed literature illustrating clearly each proposed hardware item shall be submitted to the Engineer for review.
- B. Six copies of the finish hardware schedule shall be submitted within 15 days of award of contract to the Engineer for review.
- C. Three copies of the inspection report of the manufacturer's hardware representative shall be submitted to the Engineer.
- D. If required by the Engineer, a sample of each item of hardware the Contractor proposes to use shall be submitted to the Engineer not later than ten days after requested. Such samples will be returned to the Contractor after acceptance of the completed hardware installation.

1.05 PACKAGING AND DELIVERY:

- A. Finish hardware shall have the screws, bolts, fastenings, and other necessary accessories wrapped in paper and packaged in the same package with the item of hardware. Packages shall be legibly and accurately labeled to indicate the hardware contained and the part of the work for which it is intended.
- B. Templates and schedules shall be furnished as required to manufacturers of doors and frames to permit proper preparation to receive the finish hardware.
- C. Hardware shall be delivered in the order required, and full delivery completed in ample time to permit the application within the time required for the completion of the project.
- D. Hardware required for application in the shop of a subcontractor shall be delivered directly to that shop. The balance of the material shall be delivered to the Contractor at the building site.

1.06 WARRANTY:

- A. The hardware subcontractor shall guarantee hardware furnished under this section to be, and remain, free from defects of any kind as to material and workmanship for a period of one year from the date of acceptance of the project. During the guarantee period, the hardware subcontractor shall repair or replace all defective work within 7 days following his receipt of written notice that defects exist. The guarantee need not cover items damaged by abuse.
- B. Closers shall be subject to the terms of the above guarantee, but for a period of 5 years.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

Item	Scheduled Manufacturer	Acceptable Substitute
Hinges	Ives (IVE)	Hager, Stanley
Flush Bolts & Coordinators	Ives (IVE)	Burns, Rockwood
Locksets	Falcon (FAL)	Best, Sargent
Exit Devices	Falcon (FAL)	Precision, Sargent
Door Closers	Falcon (FAL)	Norton, Sargent
Door Trim	Ives (IVE)	Burns, Rockwood
Protection Plates	Ives (IVE)	Burns, Rockwood
Overhead Stops	Glynn-Johnson (GLY)	Rixson, Sargent
Thresholds & Weatherstrip	Reese (REE)	NGP, Zero
Cylinders & Keying	Falcon (FAL)	Best, Sargent

Catalog numbers for the hardware listed in the hardware schedule are from the following

manufacturers. Equal products approved by the Engineer will be acceptable:

## 2.02 MATERIALS:

### A. GENERAL REQUIREMENTS:

1. Doors scheduled to be labeled fire doors shall have Underwriters' Laboratories, Inc., approved labeled hardware as necessary to achieve the fire rating required for the door. The entire opening shall conform with the requirements of an Underwriters' Laboratories, Inc., Test Laboratory Report.
2. Hardware shall be supplied with screws, bolts, nuts and other fastenings required for attaching the hardware. These shall be the same material and finish as the hardware item to which they pertain.
3. The hardware specified herein designates the type and quality of the hardware desired. Hardware shall be best grade, entirely free from imperfections in manufacture and finish. Qualities, weights, and sizes specified herein are the minimum that will be accepted. The brand of hardware furnished shall be equivalent to that listed.

### B. HINGES:

1. Hinges shall be stainless steel, and permanently factory lubricated. Exterior hinges shall have non-removable, non-corrosive pins. Hinges for doors more than 36-inches wide shall be heavy-gage, with 4 ball bearings. All hinges shall be ball bearing type.

### C. KICKPLATES AND PUSHPLATES:

- 1 Kickplates and pushplates shall be US 18 gage stainless steel. Edges shall be slightly rounded or beveled. Holes shall be accurately drilled and counter-sunk, for oval-head screws. Kickplates shall be 8-inches high. Kickplate width shall equal width of door, less 1-1/2-inches for single doors and less 1-inch for pair of doors. Pushplates shall be 4 x 16-inch.
- 2 Kickplates are required on every door. Pushplates are required on fire rated doors and doors without a lockset.

### D. THRESHOLD AND WEATHERSTRIPPING:

1. Exterior doors, other than aluminum entrance doors, shall have stainless steel thresholds and weatherstripping.
2. Weatherstrip for pairs of doors shall be installed on all frames and mullions, to contact both edges and top of each leaf.
3. Fasteners for thresholds shall be stainless steel machine screws and tampins.
4. Weatherstripping called out in door schedule for installation on interior door shall be soundstripping. Soundstripping shall be similar to weatherstripping, except that at door sill there shall be an automatic door bottom installed in lieu of threshold.

E. LOCKSETS:

1. Locksets and latchsets for hollow metal doors shall be heavy-duty stainless steel, mortise type, with cast lever handles or knobs and roses. Locksets and latchsets shall be by the same manufacturer.
2. Cylinders for aluminum entrance doors shall be supplied under this section. Visible parts shall have same finish as that of door.

F. DOOR CLOSERS:

1. Construction shall be rack and pinion, with compression spring. The closer body shall be made of close-grained, nonporous cast iron.
2. Closing speed, latching speed, and backcheck shall be controlled by separate, concealed, key-operated valves.
3. Closers shall have a nonferrous metal cover, attached to closer body.
4. Sizes shall be as recommended by the manufacturer. Mounting brackets and arm style (parallel or standard) shall be as required to suit job conditions.

G. DOOR STOPS:

1. Each leaf of each door shall have a stop or stop and holder. Wall stops shall be furnished where practicable and where conditions will allow. Floor stops may be supplied where wall stops cannot be used. Where neither wall stops nor floor stops are applicable or would be a hazard to personnel or subject to damage from wheeled traffic, stops shall be in the form of overhead holders.
2. Mounting of floor stops shall be adapted to height, special conditions (such as undercut doors), thresholds, etc. Floor stops at carpet shall be base riser type.
3. Wall stops shall be cast bronze or brass, with proper attachment for wall conditions. Floor stops shall be cast bronze or brass, attached by means of tamper shields and stainless steel flat-head machine screws.
4. Door stops are required for every door.

2.03 FINISHES

A. Finish of all hardware shall be US26D (BHMA 626/652) with the exceptions as follows:

1. Hinges at Exterior Doors: US32D (BHMA 630).
2. Push Plates, Pulls, and Push Bars: US32D (BHMA 630).
3. Protection Plates: US32D (BHMA 630).
4. Overhead Stops and Holders: US32D (BHMA 630).
5. Door Closers: Powder Coat to Match.

6. Weatherstripping: Clear Anodized Aluminum.

7. Thresholds: Mill Finish Aluminum.

## 2.04 KEYING

A. Provide a new key system from the same manufacturer as the locks conforming to the following requirements:

1. Provide construction cores with construction master keying for use during construction. The hardware supplier, accompanied by the Owner or Owner's security agent, shall install permanent high-security keyed cores upon completion of the project. The temporary construction cores are to be returned to the hardware supplier.
2. Provide permanent cores and cylinders to match keying of existing Water Treatment Plant Building.
3. The hardware supplier, accompanied by a qualified factory representative for the manufacturer of the cores and cylinders, shall meet with Owner and Engineer to review keying requirements and lock functions prior to ordering finish hardware. Submit a keying schedule to Engineer for approval.
4. Provide cores and cylinders, unless noted otherwise, operated by a Master Key System to be established for this project. Allow for two-hundred changes under the master key. All cylinders shall be keyed in alike or different sets as noted by their respective key set number. Do not use the letter "I" or "O" in the master key set.
5. Provide keys as follows
  - a. Ten master keys per core and/or cylinder (permanent cores to match keying of existing Water Treatment Plant Building)
  - b. Two construction core control keys
  - c. Two permanent core control keys
  - d. Six construction master keys for each type (Contractor is to provide one set of construction keys to Engineer)
6. Visual key control:
  - a. Keys shall be stamped with their respective key set number and stamped "DO NOT DUPLICATE".
  - b. Master keys shall be stamped with their respective key set letters.
  - c. Do not stamp any keys with the factory key change number.
  - d. Do not stamp any cores with key set on face (front) of Core. Stamp on back or side of cores so not to be visible when core is in cylinder.
7. Deliver master keys, change keys, and/or key blanks from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.
8. Approved products: Falcon, Best, Sargent, or approved equal.



## 2.05 KEY CONTROL SYSTEM

- A. Provide a key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of the number of locks required for the Project.
1. Provide complete cross index system set up by the hardware supplier, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
  2. Provide hinged-panel type cabinet for wall mounting.
  3. Approved products: Telkee, HPC, Lund, or approved equal.

## PART 3 - EXECUTION

### 3.01 INSTALLATION:

- A. Installation of hardware is included in the door section for which the hardware is supplied.

### 3.02 QUALITY CONTROL:

- A. After hardware has been installed, the manufacturer's representative for locks, closers, and holders shall inspect the installation and ascertain that locks are properly secured, keyways correctly positioned, and that knobs and latches are functioning properly. Door closers and holders shall be inspected for proper attachment and correct tension. An inspection report, in triplicate, shall be forwarded to the Engineer before final inspection of the building.
- B. Before final acceptance of the work, defective, damaged or missing hardware shall be replaced.

END OF SECTION

SECTION 08800GLASS AND GLAZINGPART 1 - GENERAL

1.01 WORK INCLUDED: This section of the specification covers glass and glazing, complete.

1.02 RELATED WORK:

A. Pressed metal framing and door vision panels to be glazed under this Section are being provided under:

1. Section 08100 - HOLLOW METAL DOORS AND FRAMES

1.03 REFERENCES: The following standards form a part of this specification:

American National Standards Institute, Inc. (ANSI)

ANSI A116.1 Standard Specification for Elastomeric Sealing Compounds for the Building Trade.

ANSI Z97.1 Performance Specification and Methods of Test for Safety Glazing Material Used in Building.

American Society for Testing and Materials (ASTM)

ASTM E6 Methods of Mechanical Testing

Flat Glass Marketing Association (FGMA)

FGMA Ref. 1 Glazing Manual

FGMA Ref. 2 Glazing Systems Manual

Federal Specifications

F.S. TT-S-00230 Sealing Compound: Elastomeric Type, Single Component (for Caulking, Sealing, and Glazing) in Buildings and Other Structures

Sealed Insulating Glass Manufacturers Association (SIGMA)

SIGMA 70-7-1 Glazing Recommendations for Sealed Insulating Glass Units

United States of Consumer Product Safety Commission (CPSC):

CPSC 16

Commercial Practices, Consumer Product Safety Act, 16 CFR  
1000-1402.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Six sets of manufacturer's information of the materials of this section shall be submitted to the Engineer for review.

1.06 WARRANTY:

INSULATING UNITS:

- A. Insulating glass sheet shall be guaranteed by the installer not to develop dust, moisture, or delamination film formation on the glass surfaces during the 10-year period immediately following acceptance of the building by the Owner. Units which develop any of the defects listed above shall be replaced with new units which conform to this section. The guarantee shall not apply to units damaged by breakage of glass.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. GENERAL:

1. Glass in general shall be the products of PPG Industries, Libbey-Owens-Ford Company, ASG Industries, Inc., Solar Seal Co., or CE Glass (Combustion Engineering, Inc.), or approved equal. Trademarks or other information shall not be etched in the glass.
2. Each piece of glass shall bear the manufacturer's label, giving the quality and weight or thickness.

B. TEMPERED GLASS: Tempered glass shall be Herculite, manufactured by PPG Industries, or approved equal.

C. INSULATING GLASS:

1. Insulating glass shall be sealed insulating glass units manufactured by Solar Seal Co., or approved equal. U-factor of the assembled unit shall be 0.35 or better.
2. Exterior pane of insulating glazing units to be installed in exterior wall shall be bronze tinted. Interior pane shall be clear.
3. Insulating glass unit shall consist of 2 lights of glass, primary seal of polyisobutylene specifically manufactured for primary insulating glass seals, and secondary seal of 1 or 2 part silicone insulating glass sealant.
4. Glass thickness of each pane shall be 1/4 inch.

5. Spacer frame shall be aluminum, with ultrasonically soldered corners or galvanized steel spacers with brazed corners when using 2 part silicone insulating glass sealant. Spacer frame shall be aluminum, with ultrasonically soldered corners when using 1 part silicone insulating glass sealant.
6. Primary polyisobutylene sealant shall be applied by continuous extrusion to spacer frame to form a compressed bead size of 0.018 inch thick by 0.16 to 0.24 inch wide.
7. Secondary seal of 1 part or 2 part silicone sealant shall be applied in accordance with manufacturer's current instructions, without void zones between primary secondary seal.
8. Insulating glass units shall be certified through the Insulating Glass Certification Council or shall be certified by an approved independent testing laboratory as complying with proposed specification ASTM E6 P3, using the P1 or P2 test method, Class C level or better.

#### D. SEALANTS:

1. Glazing sealants shall be as manufactured by the Tremco Manufacturing Company, Presstite Division of the Interchemical Company, H. B. Fred Kuhls, or shall be "Horn" brand, manufactured by the A. C. Horn Company, or approved equal. Where specific color is not selected by the Owner, visible compounds shall be colors which match as closely as possible to that of the adjacent framing members.
2. Glazing compound shall be a non-hardening material which will form a firm protective skin on the surface, will not require painting to prevent deterioration from the weather, will not stain stone or corrode steel, copper, or aluminum. Material shall be a one component, acrylic terpolymer sealant, "Mono", manufactured by the Tremco Manufacturing Company, or approved equal. Material shall meet the requirements of F.S. TT-S-00230, Non-sag.

### PART 3 - EXECUTION

#### 3.01 INSPECTION:

- A. Dimensions, conditions, and suitability for glazing of site-assembled frames and openings shall be checked in the field; dimensions and tolerance of factory-fabricated frames may be obtained in the field or from the manufacturer of the frame, at the glazing subcontractor's option and risk. Conditions of frames or openings which could endanger safety, permanency, or watertightness of the work shall be immediately reported to the Engineer. Start of glazing work shall constitute acceptance of frames and openings as satisfactory.

#### 3.02 INSTALLATION:

- A. Generally, glazing shall be performed in accordance with FGMA Ref. 1 and 2, as applicable to the kinds of glass specified and the types of settings shown on the drawings. FGMA recommendations regarding cleanliness, removal of moisture and lacquer, and for priming shall be followed. Installation of neoprene glazing gaskets and the glass set in the gaskets shall conform to the instructions of the gasket manufacturer.

- B. Glass shall have clean-cut edges. Nipping or grinding of corners or edges will not be permitted. Where glass edges are exposed in the completed work, arises shall be beveled and the bevels and edges polished.
- C. Glass shall be installed in accordance with the following schedule:

Type of Glass Application

Insulating	Exterior glazing
Tempered	All other interior glass panes not indicated above, extending to within less than 18 inches from an exterior walking surface or interior finish floor, or with a greater dimension than 60 inches.

- D. Insulating glass units shall, in addition to the above, be glazed in accordance with glazing recommendations of SIGMA 70-7-1.
- E. Glass exterior windows, and borrowed light frames shall be held in place with glazing beads furnished by the door or frame manufacturer. Removing and replacing of the stops and beads shall be done under this section of the specification.
- F. Glass in door, windows and borrowed lights shall be glazed with preformed vinyl or neoprene glazing strips. Glazing strips shall be mitered at corners and shall be continuous from corner-to-corner, with no intermediate joints.
- G. Glass and polycarbonate glazing shall be properly spaced and secured in position, using resilient shims against stops, and spacer blocks between edge of glass and frame, where necessary. Glass shall have equal edge clearance on all 4 sides. Glazing shall be set without springing.
- H. Glass panes larger than 50 united inches shall have setting blocks at quarter points at sill and jambs, and shims to establish uniform stop clearances. Additional setting blocks shall be used if necessary to properly support the weight of the glass.
- I. Surfaces which will be in contact with glazing materials shall have all moisture, dirt, oil, grease, lacquer or other material which might interfere with adherence of sealant or watertightness of the installation removed before glazing. No ingredients shall be added to the glazing compound. No glazing with glazing compound shall be done when temperature is 40<sup>o</sup> F or less.
- J. Glazing with neoprene or vinyl gaskets or glazing strips may be performed at any temperature, if the gaskets or strips are kept warmer than 40<sup>o</sup> F while being driven home in the frame and until the glass is fully set.

3.03 INSPECTION:

- A. Immediately preceding final inspection, labels shall be removed and glass shall be cleaned. Imperfect glass, and broken, scratched, cracked, or otherwise damaged glass shall be replaced with new glass.

B. The completed installation shall be 100 percent watertight.

END OF SECTION

SECTION 09900PAININGPART 1 - GENERAL

## 1.01 WORK INCLUDED:

- A. This Section covers field painting and coating of surfaces, complete. Shop painting of metal items is specified under the applicable item.
- B. A schedule listing the various types of surfaces to be painted and the types of paints to be applied is included herein.
- C. Only the following items shall be field painted:
  - 1. Steel channel door framing is to be painted to match exterior insulated metal panel.
  - 2. Exterior bollards.
  - 3. Metal door frame.
  - 4. Exterior man-doors (overhead doors to be factory painted by door manufacturer).

## 1.02 RELATED WORK:

- A. Section 05500 - MISCELLANEOUS METALS
- B. Section 08100 - METAL DOORS AND FRAMES

## 1.03 SYSTEM DESCRIPTION:

- A. The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, and other coatings, organic or inorganic, whether used as prime, intermediate, or finish coats.
- B. The Contractor shall do a complete painting job throughout the work in accordance with generally approved modern practices for work of high quality. Unless otherwise specified, all materials and surfaces customarily painted shall be given not less than one shop coat and two field coats or one prime coat and two finish coats, regardless of whether or not the surface to be painted is specifically mentioned.
- C. Paints containing lead shall not be used.
- D. To ensure a satisfactory painting job it is essential that the paints applied in the shop and in the field be mutually compatible. The Contractor shall determine what shop paints have been used and shall verify that field applied paints are compatible therewith.

- E. The colors of finish coatings shall be selected by the Engineer from color chips submitted by the Contractor for review. The color selection shall be in the form of a schedule indicating the colors to be used on the various surfaces. The colors used in the final work shall be in accordance with the color schedule and shall match the selected color chips.
- F. All coating systems used for potable water applications shall be previously approved by the National Sanitation Foundation (N.S.F.) in accordance with Standard 61. Evidence of such approval shall be an approval letter from N.S.F. listing the submitted materials.
- G. Paints submitted shall meet all Federal and State E.P.A. regulations pertaining to volatile organic compounds (VOC) compliance.

1.04 REFERENCES:

- A. The following standards form a part of these specifications, and indicate the minimum standards required:

American Society for Testing and Materials (ASTM)

ASTM F1869 Moisture Vapor Emission Rate Using Anhydrous Calcium Chloride

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL CONDITIONS, SUBMIT THE FOLLOWING:

- A. Six (6) sets of manufacturer's literature of proposed paints shall be submitted to the Engineer for review.
- B. Six (6) sets of the painting schedule shall be submitted to the Engineer for review.
- C. Three (3) sets of color chips shall be submitted to the Engineer for selection of colors.

1.06 DELIVERY AND STORAGE:

- A. Paint shall be delivered to the site in the manufacturer's sealed containers. Each container shall bear the manufacturer's label, listing the brand name, type and color of paint, and instructions for thinning. Thinning shall be done only in accordance with directions of the manufacturer. Job mixing or job tinting may be done when approved by the Engineer and for preparing sample colors.
- B. Painting materials shall be stored and mixed in a single location designated by the Engineer for this purpose. The Contractor shall not use any plumbing fixture or pipe for mixing or for disposal of any refuse. He shall carry all necessary water to his mixing room, and shall dispose of all waste outside of the building in a suitable receptacle. The Contractor will be held responsible for any damage done due to failure to observe these precautions.
- C. The paint storage area shall be kept clean at all times, and any damage thereto or to its surroundings shall be repaired. Any oily rags, waste, etc., shall be removed from the building



every night, and every precaution shall be taken to avoid danger of fire.

- D. Heat must be provided in the storage area if paints are to be stored during winter months. The temperature shall be maintained above 40 degrees F. at all times.

## PART 2 - PRODUCTS

### 2.01 MATERIALS:

#### A. PAINT SCHEDULE:

Except as otherwise indicated, all paint used shall be of the type listed in the schedule below, by Tnemec Company, Inc., or equivalent paints by Sherwin-Williams Company, International Paints, or other approved paint fully equal to paint manufactured by the above named companies. No brand other than those named will be considered for approval unless the brand and type of paint proposed for each item in the following painting schedule are submitted in writing to the Engineer, along with sufficient data supported by certified tests.

#### PAINT SCHEDULE

<u>Key</u>		<u>Tnemec</u>	<u>Note 1</u>
AGE	Acrylic Gloss Enamel	1029 Enduratone	3.5
APE	Acrylic Polyurethane	73 Endura-Shield Enamel	3.0
BO	Bleaching Oil	Note 5	
CEE	Catalyzed Epoxy	L69F Epoxoline II	4.0
CEM	Catalyzed Epoxy Mastic	27 WB Typoxy	Note 3
CEP	Catalyzed Epoxy Primer	L69F Epoxoline	3.0
EMC	Epoxy Modified Cement	218 Mortar-Clad	Fill/Surface
EP	Epoxy-Polyamide (thinned 30% #4 Thinner)	FC 22 Pota-pox	25-30
EPW	Water-based Epoxy Primer	151 Elasto-Grip	1.0-1.5
HGV	High Gloss Varnish		Note 2
HSE	High Solids Epoxy (Min. 69%)	L69 Epoxy	6.0
MA	Modified Acrylic	115 Uni-bond	3.0

MAE	Modified Acrylic Elastomer	156 Envirocrete	6.0-8.0
MCU	Moisture Cured Urethane	Series 1 – Omnithane	2.5-3.0
MPE	Modified Polyamine Epoxy	Series 435 – Permaglaze	15-20 mils
NE	Novolac Epoxy	282 Tneme-Glaze	7.5
PEF	Polyamine Epoxy Finish	280 Tneme-Glaze	6.0-8.0
PEP	Polyamine Epoxy Primer	201 Epoxoprime	6.0-8.0
PVA	PVA Sealer	151 Elasto Grip	0.75-1.5
PWC	Potable Water Coating	Series FC 22 Pota Pox	25-30
SA	Silicone Aluminum	39-1261 (Note 4)	1.5
Z	Zin-Rich Primer	90G-1K97 Tneme-Zinc	2.5

Notes

- 1: Minimum Dry Film Thickness/Coat (mils)
- 2: Furnished by reputable manufacturer and acceptable to the Engineer.
- 3: Shall be used as a tie-coat between incompatible paints @ 3.0-4.0 mils.
- 4: This paint is suitable for temperatures up to 1200°F and must be final cured at 400°F for one hour.
- 5: Bleaching oil is a translucent gray paint stain with a chemical additive to enhance the natural bleaching tendencies of cedar shingles.

B. PAINTING SCHEDULE:

Paint shall be applied in accordance with the paint key listed on the following schedule and defined in the preceding Paint Schedule:

<u>Item</u>	<u>Field Coats</u>		
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
<u>Metals:</u>			
Exposed exterior structural steel	NE	NE	-
<u>Doors and Frames:</u>	CEE	CEE	-
Exterior insulated metal doors & frames	CEP CEP	CEE CEE	- APE

\* Spot Prime

^ If galvanized metal is provided with a light top coat sealer, light brush blast surface preparation is required prior to first field coat

B. SPARE PAINT:

1. Furnish to the Owner one unopened gallon of each type and color of paint used on the work.
2. Furnish both components for each type and color of epoxy paints used on the work.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

- A. Before any surface is painted, it shall be cleaned carefully of all dust, dirt, grease, loose rust, mill scale, old weathered paint, efflorescence, etc. All necessary special preparatory treatment shall then be applied. Where required, imperfections and holes in surfaces to be painted shall be filled in an approved manner.
- B. Cleaning and painting shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surfaces which have been cleaned, pretreated, or otherwise prepared for painting, shall be painted with the first field coat as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surface.
- D. Exposed nails and other ferrous metal or surfaces to be painted with water-thinned paint shall be spot primed with aluminum.
- E. Cracks and holes in masonry and concrete surfaces to be painted shall be filled with patching material recommended by the coatings manufacturer. Surfaces shall be clean and dry before painting. All efflorescence, grease, oil, etc., shall be removed before painting, and all loose, crumbling material shall be removed by vigorous wire brushing over entire surface, followed by removal of all dust. All high areas on masonry and concrete surfaces such as mortar daubs, mortar ridges at joints, and ridges at form joints in concrete shall be removed.
- F. All nonferrous metal surfaces to be painted shall be cleaned of all dirt, grease, oil and other foreign substances uniformly profiled per SSPC SP 7.
- G. All galvanized surfaces to be painted shall be brush blasted to create a uniform surface profile per SSPC SP7.
- H. Before application of the first full field coat, abraded areas of all non-galvanized ferrous metal items having shop coats shall be touched up with paint of the type indicated on the Painting Schedule.
- I. All items of equipment such as motors, pumps, instrumentation panels, electrical switchgear, and similar items, that have been given shop coats, paint filler, enamel or other treatment customary with the manufacturer, shall have, after installation, all scratches and blemishes touch up prior to application of the first field coat. Factory prefinished items not to be field painted shall be touched up with matching paint to repair any areas damaged during installation.

- J. All submerged concrete surfaces that are to receive an epoxy coating shall be brush blasted to remove surface laitance and provide a uniform surface profile, reference SSPC SP #13. Surface preparation may commence one week after the concrete has been pronounced cured. The curing period is defined as that length of time during which the concrete is fully hydrated (28 day cure). Patch holes and voids with specified modified epoxy cement prior to coating.
- K. Concrete floors that are to receive epoxy coating shall be brush blasted or shot blasted per SSPC SP #13 and ICRI Surface Profile requirements per the coating manufacturer (Blastrack). Check for excessive moisture migration per ASTM F1869, Moisture Vapor Emission Rate Using Anhydrous Calcium Chloride. Test results not to exceed 3 lbs per 1,000 square feet in one 24-hour period.
- L. Hardware accessories, machine surfaces, plates, lighting fixtures, and similar items in place prior to cleaning and painting, and not intended to be painted, shall be removed during painting operations and repositioned upon completion of each area or shall otherwise be protected.
- M. All PVC pipe to be painted shall be brush blasted per SSPC SP7 or shall be sanded to provide a uniform surface profile.

3.02 APPLICATION:

- A. Paint shall be used and applied as recommended by the manufacturer without being extended or modified, and with particular attention to the correct preparation and condition of surfaces to be painted.
- B. Paint shall be applied only within the temperature range recommended by the manufacturer. Painting of surfaces when they are exposed to the sun shall be avoided.
- C. Paint shall not be applied to wet or damp surfaces and shall not be applied in rain, snow, fog, or mist, or when the relative humidity exceeds 85 percent.
- D. No paint shall be applied when it is expected that the relative humidity will exceed 85 percent or that the air temperature will drop below 40°F within 18 hours after the application of paint. Dew or moisture condensation should be anticipated and if such conditions are prevalent, painting shall be delayed until midmorning to be certain that the surfaces are dry. Further, the days painting should be completed well in advance of the probable time of day when condensation will occur, in order to permit the film an appreciable drying time prior to the formation of moisture.
- E. All paint shall be applied under favorable conditions by skilled painters and shall be brushed out carefully to a smooth, even coating without run or sags. Enamel shall be applied evenly and smoothly. Each coat of paint shall be allowed to dry thoroughly, not only on the surface but also throughout the thickness of the paint film before the next coat is applied. Finish surfaces shall be uniform in finish and color, and free from flash spots and brush marks. In all cases, the paint film produced shall be satisfactory in all respects to the Engineer.
- F. Exposed nails and other ferrous metal or surfaces to be painted with water-thinned paints shall be spot primed with aluminum paints.

- G. In order to provide contrast between successive coats, each coat shall be of such tint as will distinguish it from preceding coats.
- H. The Contractor shall not only protect his work at all times, but shall also protect all adjacent work and materials by the use of sufficient drop cloths during the progress of his work. Upon completion of the work, he shall clean up all paint, spots, oil, and stains from floors, glass, hardware, and similar finished items.
- I. If paints are thinned for spraying, the film thickness after application shall be the same as though the unthinned paint were applied by brush. That is, the addition of a thinner shall not be used as a means of extending the coverage of the paint, but the area covered shall be no greater than the area that would have been covered with the same quantity of unthinned paint.
- J. Blast cleaned metal surfaces shall be coated immediately after cleaning, before any rusting or other deterioration or contamination of the surface occurs. Blast cleaned surfaces shall be coated not later than 8 hours after cleaning under ideal conditions or sooner if conditions are not ideal.
- K. The use of carbon dioxide or carbon monoxide emitting heaters is not permitted during the painting operation. Only indirect hot-air systems shall be permitted.

3.03 PIPING COLOR:

- A. Piping colors are to be coordinated by trade in compliance with all local and state building codes and workplace safety requirements.
- B. Piping which is not painted shall be color coded with bands placed at each change in direction and no more than 5 feet apart on straight runs.

END OF SECTION

SECTION 10200LOUVERS AND VENTSPART 1 - GENERAL

## 1.01 SUMMARY

- A. Section Includes: Provide labor, materials and equipment necessary to complete the work of this Section:
  - 1. Louvers.
- B. Related Sections:
  - 1. Section 05500 – Miscellaneous Metals.
  - 2. Division 15 - Mechanical

## 1.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer louvers to meet the requirements of the Massachusetts Building Code, and the requirements of this Section where more stringent, for wind loads.
  - 1. Design wind velocity: 90 mph (145 kph.)
  - 2. Design wind load: 35 psf (1675 Pa) acting inward and 35 psf (1675 Pa) acting outward.
- B. Thermal Movements: Design louvers which allow thermal movements resulting from change in ambient and surface temperatures without buckling, opening of joints, overstressing of components, and other detrimental effects.
  - 1. Ambient Temperature Change: 120 °F (67 °C).
  - 2. Surface Temperature Change: 180 °F (100 °C).
- C. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units 48 inches (1220 mm) wide by 48 inches (1220 mm) high. Test units according to AMCA 500.
  - 1. Perform testing on unpainted, cleaned, degreased units.
  - 2. Perform water-penetration testing on louvers without screens.
- D. Airborne Sound Transmission Loss: Provide acoustical louvers complying with airborne sound transmission loss ratings indicated, as demonstrated by testing manufacturer's stock units according to ASTM E 90.

## 1.03 SUBMITTALS

- A. Prepare submittals in accordance with the General Conditions and Section 01200.
- B. Product Data: Submit manufacturer's descriptive brochures, specifications and installation instructions illustrating products proposed for use. Include large scale drawings of products,

details of materials and finishes and other relevant information.

- C. Shop Drawings: Submit complete shop drawings for showing actual field conditions. Show details of installation, rough openings required and details of backing and connections. Submit sections at large scale. Indicate gauges and finishes of metals.
- D. Samples:
  - 1. Color samples: Custom Color Selection to coordinate with Metal Panel Product. Submit 2 sets of color chips, swatches or other type of sample for factory finished items for Engineer's selection.
  - 2. Office samples: Submit one each of any specialty item requested by the Engineer for review. Samples will be made available for incorporation into the project (if approved) after review.

## PART 2 -PRODUCTS

### 2.01 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
  - 1. Continuous Vertical Assemblies: Where height of units exceeds fabrication and handling limitations, fabricate units for field-bolted assembly with close-fitting joints in jambs and mullions. Reinforce with splice plates and without interrupting blade-spacing pattern.
- B. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.
  - 1. Frame Type: Channel type, unless otherwise indicated.
- C. Include supports, anchorages, and accessories required for complete assembly.
- D. Provide vertical mullions of type and at spacing indicated, but not more than recommended by manufacturer, or 72 inches (1800 mm) o.c., whichever is less. At horizontal joints between louver units, provide horizontal mullions, unless continuous vertical assemblies are indicated.
- E. Provide sill extensions and loose sills made of same material as louvers where required for drainage to exterior and to prevent water penetrating to interior.
- F. Join frame members and louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.
- G. Join frame members to one another and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view; unless

otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

## 2.02 LOUVERS

- A. General: Provide factory-assembled louvers with welded frames and tight hairline joints complying with the following specifications in custom color to match Metal Panel System. Ductwork, dampers and other connected work are specified elsewhere.
- B. Provide louvers with minimum net free area as indicated on mechanical drawings or specifications. Provide louvers meeting the certification requirements of AMCA (Air Movement and Control Association).
- C. Available manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to:
  - 1. Airline Products.
  - 2. Airolite Company.
  - 3. Construction Specialties, Inc.
  - 4. Greenheck.
  - 5. Industrial Louvers, Inc.
  - 6. Nystrom Building Products.
- D. Materials:
  - 1. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer to produce required finish.
  - 2. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5 or T-52.
  - 3. Fasteners: Of same basic metal and alloy as fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.
    - a. Use types, gages, and lengths to suit unit installation conditions.
    - b. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
  - 4. Anchors and Inserts: Of type, size, and material required for type of loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
  - 5. Type: Fixed continuous blade.
  - 6. Material: Extruded aluminum; blade thickness 0.081 inch; frame thickness 0.0125 inch (0.3 mm).
  - 7. Blade Style: Standard
  - 8. Blade angle; 45 degrees
  - 9. Frame Depth: 4 inches (100 mm).
  - 10. Bird screen: 1/2 inch (13 mm) square 14 gauge aluminum wire screen.
  - 11. Finish: Color to match metal panel system.
  - 12. Mounting: Continuous angle at inside of frame drilled to accept expansion anchors.
  - 13. Mounting: Style as detailed, or as required by adjacent construction.

## PART 3 -EXECUTION



3.01 INSPECTION

- A. Inspect areas and surfaces indicated to receive louvers.
- B. Do not begin installation if conditions exist which would prevent satisfactory installation and long-term performance of the product.
- C. Inform the Engineer of any deficiencies or installation problems.

3.02 INSTALLATION

- A. Install louvers plumb, level, square and securely fastened to backings and supports with manufacturer's recommended fasteners.
- B. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- C. All exposed fasteners shall be chrome plated or cadmium plated bolts or screws long enough to develop full strength in the backing.
- D. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- E. Protect installed louvers from scratches and mars.
- F. Clean louvers before presenting work for acceptance.

END OF SECTION

SECTION 13121PRE-ENGINEERED METAL BUILDINGPART 1 - GENERAL

## 1.01 WORK INCLUDED:

- A. Provide all labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Design, fabricate, ship, and erect a complete Metal Building System, including but not limited to the following as described herein and/or shown on the Drawings:
    - a. Primary and secondary framing
    - b. Metal wall and roof panels, flashing, and trim
    - c. Gutters and downspouts
    - d. Insulated metal wall panels- 3” Min. (R-22.5)
    - e. Framed openings
    - f. Roof and wall penetration seals
    - g. Supplemental framing

## 1.02 RELATED WORK:

- A. Section 03301 - CAST-IN-PLACE CONCRETE

## 1.03 REFERENCES: The following standards form a part of this specification:

- A. American Iron and Steel Institute
1. Specification for the Design of Cold-Formed Steel Structural Members – 2002 Edition
  2. AISI “Design of Light Gage Steel Diaphragms”
- B. American Institute of Steel Construction
1. Manual of Steel Construction – Thirteenth Edition
- C. Metal Building Manufacturers Association
1. Metal Building Systems Manual, 2002
- D. American Welding Society
1. AWS D1.1 – Structural Welding Code – Steel
- E. American Society for Testing and Materials
1. ASTM A36 - Specification for Carbon Structural Steel
  2. ASTM A123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  3. ASTM A153 – Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  4. ASTM A307 – Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
  5. ASTM A325 – Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
  6. ASTM A463 – Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process

7. ASTM A475 – Specification for Zinc-Coated Steel Wire Strand
8. ASTM A490 – Specification for Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
9. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
10. ASTM A501 – Specification for Hot-Formed Welded Seamless Carbon Steel Structural Tubing
11. ASTM A529 – Specification for High-Strength carbon Manganese Steel of Structural Quality
12. ASTM A572 – Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
13. ASTM A653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
14. ASTM A792 – Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
15. ASTM A992 – Specification for Structural Steel Shapes
16. ASTM A1011 – Specification for Steel Sheet and Strip Hot Rolled Carbon, Structural high Strength Low-Alloy and High Strength Low-Alloy with Improved Formability

F. Society for Protective Coatings

1. Surface Preparation Specifications:
  - a. SSPC – SP 1 – Solvent Cleaning
  - b. SSPC – SP 2 – Hand Tool Cleaning
  - c. SSPC – SP 3 – Power Tool Cleaning
2. Paint Application Specifications:
  - a. SSPC-PQ 1, Shop, Field and Maintenance Painting

G. Federal Specifications

1. TT-P-645, Primer, Paint, Zinc-Chromate, Alkyd Type

1.04 DESIGN REQUIREMENTS

- A. The Metal Building System shall be designed by the Manufacturer as a complete system. All components of the system shall be supplied by or compatible with the Metal Building System provided by the Manufacturer. The building systems shall be provided from a “single source manufacturer” with all required warranties for the complete building system originating from the single source manufacturer.
- B. Refer to the Structural Drawings for Design Loads and Design Criteria.
- C. All designs required under this Section shall be performed by a Professional Structural Engineer registered in the Commonwealth of Massachusetts.
- D. Exterior metal wall and roof panel assemblies and supports shall be designed for the specified wind and seismic loads. Refer to Structural Drawings for Design Loads.
- E. Design and provide special framing for the support of architectural features including, but not limited to overhead doors and personnel doors.

F. Design, detailing and erection shall comply with the applicable standards listed in 29 CFR Part 1926 – “Safety Standards for Steel Erection”.

#### 1.05 SUBMITTALS

- A. Product Data: Submit manufacturers product information, specifications and installation instructions for building components and accessories.
- B. Submit certificate showing manufacturer is a participant of the AISC Metal Building Certification Program.
- C. Samples: Submit 12-inch long, full width wall and roof panels with the specified finish. Colors to be selected by the Engineer from the manufacturer’s standard color pallet. As a minimum, standard color pallet shall include up to six color options.
- D. Shop Drawings:
1. Submit drawings showing primary structural framing, secondary wall and roof framing, supplemental framing, wall sections and details, framed openings, snow guards, wall and roof panels, and other system components and accessories not detailed in manufacturer’s product data, to be reviewed by the Engineer.
  2. Submit anchor bolt plans showing anchor bolt locations, materials, diameter, projection, column base plate dimensions, and column base reactions for all loading combinations.
  3. All shop drawings shall be signed and sealed by a Structural Engineer registered in the Commonwealth of Massachusetts.
- E. Design Certification Letter: Submit written Certification prepared and signed by a Structural Engineer registered in the Commonwealth of Massachusetts, stating that the structural framing and building components are in compliance with the criteria as indicated in the Specifications and Drawings and that the foundation design will support the building reactions and other loads imposed by the building use.
- F. Submit erector certification as specified in this Section.

#### 1.06 QUALITY ASSURANCE:

- A. Qualifications:
1. Manufacturer: The company manufacturing the products specified in this Section shall have a minimum of five (5) years’ experience in the manufacture of steel building systems. The manufacturer shall be certified under the American Institute of Steel Construction’s Category MB Certification Program.
  2. Erector: The Erector shall have at least five (5) years’ experience of erecting steel building systems and shall be authorized, in writing, by the manufacturer as being trained and qualified to erect their products. The erector shall also be knowledgeable of the AISC “Code of Standard Practice for Steel Buildings and Bridges” and the Metal Building Manufacturer’s Association “Metal Building Systems Manual”.
  3. Welder, Tacker and Welding Operator Qualifications: Use welders, tackers and welding operators who have been previously qualified by tests as prescribed in the Structural Welding Code, AWS D1.1 of the American Welding Society to perform type of work

- required.
4. The metal building manufacturer and erector shall maintain a quality control program in accordance with the AISC Code of Standard Practice. The erector shall be qualified by the building manufacturer to install and maintain the warranties applicable to this specification. All erectors shall have 10 hour OSHA training and have all personal protection equipment required to perform the work in accordance with all safety requirements and regulations in force.
  5. The roof system shall carry a U.L. (Underwriters Laboratories) wind uplift resistance classification of 90.

B. Testing and Inspection:

1. Refer to Section 01450 for Structural Testing and Inspections. The inspection and testing services provided by the Independent Testing Agency do not relieve the Contractor from the responsibility to provide supervision, testing, inspection, and Quality Control in order to assure conformance with these Specifications.

### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Store materials above the ground surface on platforms, skids, blocking or other supports.
- B. Protect from exposure to conditions that produce rust, or allows dirt or debris to collect on surfaces of framing, roof and wall panels.
- C. Handle steel and roofing panels so no parts are bent, broken, or otherwise damaged and avoid damage to other material and work.

### 1.06 WARRANTY

- A. Manufacturer and/or authorized dealer shall submit applicable warranties and/or certifications for the product to the Owner through the Engineer. Submit sample of warranties along with Bid.
- B. Manufacturer and/or authorized dealer shall provide a 20-year weather tightness guarantee against wall and roof leaks arising out of or caused by ordinary wear and tear of the elements subject to atmospheric conditions.
- C. Manufacturer shall provide a 25-year guarantee for prefinished color coatings against chipping, cracking, or crazing, blistering, peeling, chalking, or fading.
- D. Include costs for the above stated warranties and certificates in the cost of the Metal Building System.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. All materials shall be new and meet or exceed the physical requirements of the design and fabrication process.

- B. The manufacturer shall maintain test reports on material inventory from which building components are fabricated.

## 2.02 STRUCTURAL FRAMING

- A. Primary framing shall consist of tapered or uniform depth hot rolled sections and/or welded plate sections as indicated.
- B. Secondary framing shall consist of hot rolled sections, welded plate sections, cold-formed steel sections, and/or open web joists.
- C. Framing shall be fabricated from material based on the requirements of ASTM A36, A570, or A572 as applicable. Fabrication shall generally comply with the applicable sections of AISC and AISI Specifications.
- D. Bolts for primary framing field connections shall be high strength bolts conforming to ASTM A325.
- E. Steel Pipe Sections: Comply with ASTM A53.
- F. Structural Tubing: Comply with ASTM A 500, Grade B.
- G. All structural framing shall be either shop coated or hot-dip galvanized. Shop primer shall meet or exceed the performance requirements of Federal Specifications TT-P-636D, TT-P-664C, and SSPC Paint 25.
  - 1. Primer for steel shall be compatible with the specified finish paint systems.

## 2.03 ROOF SYSTEM

- A. General
  - 1. Colors shall be selected by the Engineer.
  - 2. System Performance: UL Class 90 rating for wind uplift.
  - 3. Panels shall be coated on both sides.
- B. The roof system shall consist of a double-lock standing seam roof panel over thermal blocks over insulation, over a vapor barrier, and shall include all clips, closures, sealants, flashing and fasteners.
- C. Roof Assembly:
  - 1. Roof Panel: Field-formed double-lock standing seam 360 with factory-applied sealant. Minimum panel thickness of 24 gauge. Base coating shall be hot-dip galvanized per ASTM A653 coating class G-90. Finish coating shall be premium factory-applied fluoropolymer coating utilizing 70% Kynar 500 Resin, minimum 0.8 mil DFT exterior face. Panels shall be of the maximum possible lengths to minimize end laps. Provide roof panel manufacturer's roof support clips that allow the entire roof to expand and contract, as thermal conditions require.
  - 2. Insulation: Provide a complete integrated below purlins vapor barrier and insulation

retaining system. The full depth of the Purlin cavity will be filled with un-faced fiberglass insulation blankets, cut to fit the dimensions between the purlins with an over the top of the purlins un-faced fiberglass blanket running from ridge to eave. The roof panel system will be installed with thermal blocks over the completed insulation system. The insulation fabric and retaining banding system will also be designed as a fall protection system. At the time of installation the manufacturers design and cut sheet shall be submitted as confirmation of the proper design and maximum R value for the Purlin depth that the building has been designed. Vapor barrier fabric shall be White in color. Draped fiberglass blankets with vinyl reinforced polyester film vapor barrier (3 mils) with thermal block and UL flame spread rating of 25 or less. Minimum R-value shall be R-27.

## 2.04 WALL SYSTEM

### A. General

1. For limits of wall panels see Drawings.
2. Colors shall be standard colors determined by the Engineer as summarized in 1.05

### B. Insulated Wall Panels

#### 1. Wall Panel

- a. Configuration: Flat metal panel with concealed fasteners.
- b. Minimum metal thickness: 26 gauge both faces, galvanized, per ASTM A653, G90.
- c. Coatings, exterior, same as roof panels.
- d. Insulation: Continuous foamed-in-place, non-CFC polyurethane.
- e. Panel width shall be 36 inches. Panel thickness shall be 3 inches. Panel length shall be one piece from base of building to top of wall at roof eave and rake lines, unless shown otherwise on Drawings. Insulated wall panels will have a factory applied sealant at the interlocking, thermal break connection. All flashings, support angles, mastics, caulking, and butyl compressive seals shall be installed per the manufacturers required installation manuals. All corners, eaves struts, rakes, and connections that have any voids shall have fiberglass insulation and or foam insulation installed to accomplish a continuous insulation system.
- f. All fasteners shall be concealed prepainted to match the wall color.

## 2.05 ACCESSORIES

- A. Roof Supplemental Steel: Provide structural framing for support of supported equipment and suspended equipment or wall systems framing into roof purlins as indicated on the Drawings.
- B. Framed Openings: Provide structural framing for roof and wall openings to accommodate roof curbs, personnel doors, windows, and louvers.
  1. Wall and roof openings shall be trimmed out and made weather tight by the Metal Building Contractor. The Metal Building Manufacturer shall supply trim components.
- C. Gutters and Downspouts: Manufacturer's Standard offering, including all offsets and 90-degree bends for downspouts. Gutters and downspouts shall be made from galvanized steel class G90. The Engineer shall select finish colors.
- D. Wall and Roof Penetrations: Manufacturer's standard offering to cut and seal wall and roof openings for miscellaneous flues, plumbing and electrical penetrations:

1. Metal Building Contractor to coordinate roof openings, vents, plumbing and electrical penetrations with mechanical, plumbing and electrical drawings.
  2. Roof penetrations shall not penetrate the standing seam of roof panels.
- E. Roof openings shall be cut and sealed by the metal building contractor. Roof curbs shall be supplied, installed and made weathertight by the Metal Building Contractor. Sizes to be coordinated with mechanical drawings.
1. Roof curb installation shall be panel over curb flange on high side and panel under curb flange on low side.
  2. Roof curbs to have a cricket on the high side. All roof penetrations shall be provided and installed by the Metal Building Contractor and shall be incorporated in the weather-tightness warranty by the building manufacturer and the Metal Building Contractor.
- F. Louvers: Coordinate with HVAC performance specification
- G. Snow Guards: Mechanically Fastened. Two rows, spacing per manufacturer recommendations.
- H. Accessories, including but limited to, roof curbs, sill angles, panel base metal closures, flashings, soffits, eave trim, gable trim, door side flashing, header flashing, fascias and trim, shall be the manufacturer's standard offering and be made of galvanized steel class G90. Finish coatings shall be the same as the roof panels. Colors shall be selected by the Engineer.

### PART 3 - EXECUTION

#### 3.01 INSPECTION

- A. Examine the building foundation for conformance with approved anchor bolt plans. Do not proceed with the work until unsatisfactory conditions have been corrected.

#### 3.02 STRUCTURAL FRAMING

- A. Erect the building structure in accordance with approved erection drawings and instructions.
- B. Provide temporary guys and bracing for squaring, plumbing, and securing the building until completion of erection.
- C. Erection tolerances shall be those set forth in the AISC Code of Standard Practice, latest edition, including tolerances for individual members.

#### 3.03 ROOF AND WALL COVERINGS

- A. Roof and wall coverings shall be installed in accordance with erection drawings and instructions. Install all gaskets, joint fillers, seals, and flashing where indicated for weatherproof performance of the panel systems.
1. Connect roof panels to purlins with concealed clips in accordance with manufacturer instructions.
  2. Wall panels shall be continuous from wall base to roof, unless detailed otherwise on the Architectural Drawings.



B. Install sill angle, trim and closures to provide a weather/draft tight seal between the sill angle and top of concrete and at wall and roof panel interfaces.

#### 3.04 PROTECTION AND CLEANING

A. Clean all structural steel, roof and wall panels of all dust, dirt and debris when they are installed and prior to the installation of any building components in the building.

END OF SECTION

SECTION 15400PLUMBINGPART 1- GENERAL

## 1.01 GENERAL PROVISIONS

- A. The GENERAL REQUIREMENTS, DIVISION 1, AND BIDDING AND CONTRACT REQUIREMENTS, DIVISION 0, are hereby made a part of this Specification Section.
- B. Examine all Drawings and all Sections of the Specifications and requirements and provisions affecting the work of this Section. All work shall be performed by a Massachusetts Licensed Plumber in accordance with the current Massachusetts State Building code requirements. The plans and specifications are schematic only, and the Plumbing Contractor shall provide all other labor, materials, and equipment as needed in order to provide a complete and operable system.
- C. Plumbing systems shall be approved by Plumbing Inspector and shall meet the requirements of Massachusetts Uniform State Plumbing Code, 248 CMR 10.00.

## 1.02 SCOPE OF WORK

- A. Work will include the installation of the following:
  - 1. New floor drain with elastomeric rubber trap guard, or equal, along with the cast iron drainage and vent piping as shown on the drawings.
  - 2. All cutting and core drilling as necessary for installations.

## PART 2- PRODUCTS

## 2.01 INDUSTRIAL WASTE AND VENT PIPING

- A. Service: Below ground sanitary waste, and vent pipe and fittings.

Pipe Material: Service weight cast-iron hub and spigot pipe (ASTM-A74) coated with asphalt or coal tar pitch.

Fitting Material: Cast-iron fittings

Pipe Joints: Resilient gaskets (ASTM-C-564)

B. Service: Above ground sanitary waste, vent pipe and fittings.

Pipe Material: Cast-iron hubless pipe (CISPI301), service weight cast-iron; hub and spigot (ASTM-A-74); or DWV copper tube.

Fitting Material: Cast-iron, cast brass or wrought copper drainage fittings.

Pipe Joints: Corrugated 304 stainless steel coupling with neoprene gasket, (3" wide w/ 4 banks for up to 4" pipe, 4" wide w/ 6 bands for 6" to 10" pipe), resilient gaskets (ASTM-C-564) or soldered using ASTM B32, 95-5 tin-antimony

Miscellaneous: Cast-iron pipe, 8-inches and larger shall have pipe clamps and rods at each fitting.

## 2.02 FLOOR DRAINS

A. Floor drains shall be of cast iron construction, heavy duty round top floor drain with deep body and caulk outlet, cast iron strainer sediment bucket, provide inline trap sealer and elastomeric rubber trap guard insert to prevent sewer gas or backflow into building.

## PART 3- EXECUTION

### 3.01 IDENTIFICATION

#### A. GENERAL

1. Where portions of piping systems are to be covered or concealed before completion of the project, those portions shall be tested separately in the manner specified herein for the respective entire system.
2. Any piping or equipment that has been left unprotected and subject to mechanical or other injury in the opinion of the Engineer shall be retested in part or in whole as directed.
3. The Engineer retains the right to request a recheck or resetting of any pump or instrument by this contractor during the guarantee period at no additional cost to the Contractor.
4. Repair, or if directed by the Engineer, replace any defective work with new work without extra charge to the Contract. Repeat tests as directed, until the work is proven to meet the requirements specified herein.
5. Restore to its finished condition any work, damaged or disturbed, provided by other contractors and engage the original contractor to do the work of restoration to the damaged or disturbed work.
6. The fixtures shall be tested for stability of support and satisfactory operation. The piping shall be tested when directed by the Engineer for stability.
7. After the fixtures are set and connected, and the piping systems to same have been

tested, this contractor shall turn water on the fixtures, and equipment, fill the traps, etc., and the proper operation of all items shall be demonstrated by him in the presence of and to the satisfaction of the Architect/Engineer or their designated representative.

8. Caulking of screwed joints or holes in piping will not be acceptable.
9. This Contractor shall notify the Engineer and any inspectors having jurisdiction, a minimum of 48 hours in advance of making any required tests so that arrangements may be made for their presence to witness his scheduled tests.

B. Specific:

1. Sanitary (Waste and Vent) Piping Systems:

- a. Before the installation of fixtures, and equipment each system including vents shall be tested in its entirety or in sections. If this entire system is to be tested, all openings shall be plugged to permit the system to be filled with water to the level of the vent stack of each system above the roof where practical. Each system shall hold this water for a minimum of 15 minutes prior to an inspection. The system shall be tight at all points.
- b. Where a portion of the system is to be tested, the test shall be conducted in the same manner as specified herein for the entire system, except a vertical sack ten feet above the highest horizontal line to be tested may be installed, and filled with water to maintain sufficient pressure. A pump may be used to supply the required pressure. The pressure shall be maintained for a minimum of 15 minutes prior to an inspection. The system shall be tight at all points.

3.02 CERTIFICATES OF APPROVAL

- A. Upon completion of the work, furnish to the Owner through the Engineer, in duplicate, certificates of inspection and/or approval from state and local inspection authorities having jurisdiction indicating the installed systems compliance to their requirements.

3.03 SANITARY WASTEWATER DRAINAGE PIPING

- A. Although the trenching and backfilling will be performed under another Section of the Specifications, this Contractor will be responsible for the proper execution of this work and shall do all hand trimming of trench bottoms. All piping must be laid on good foundation with solid uniform bearing through the entire length. The bottom of all trenches shall be rounded so that half of the circumference of the pipes will rest firmly on compacted sand at proper line and grade. Hub holes shall be dug to insure pipe resting for its entire length upon the bottom of the trench.
- B. This Contractor shall be responsible for checking each pipe for alignment, centerline elevation and invert grade for underground installations.
- C. At times when work is not in progress, open ends of pipes and fittings shall be securely closed so that no trench water, earth or other substance will enter the pipe or fittings. Pipe

laid through rock excavation shall rest on a six-inch layer of well compacted sand.

- D. The waste, vent, and piping four inches and larger in diameter shall pitch a minimum of 1/8 inch per foot.
- E. The vent stacks shall be connected as shown and extended through the roof a minimum of 18 inches.
- F. Branch connections to each drainage system shall be made with “Wye” and long turn “Tee Wye” fittings. Installation of short radius ¼ bends, common offsets; double hub fittings and saddles will not be approved. Only fittings conforming to the Code shall be installed.
- G. The changes in direction of each drainage system shall be made with “Wye” branches and 1/8 bends. Provide long sweep bends a bottom of stacks with a vertical cleanout just above the floor at places where a “Wye” and 1/8 bends at bottom of stacks and end cleanouts cannot be installed.
- H. Vents shall be connected to the discharge of each trap in the sanitary system, thence carried individually to a point above the flood level of the fixture before connecting with any other vent pipes. Pitch the branch vents back to the fixtures.

### 3.04 GENERAL INSTALLATION REQUIREMENTS

#### A. Piping Installation

1. Install piping approximately as shown on the drawings and as directed during installation by the Engineer or the Architect.
2. Piping shall be installed as straight and direct as possible forming right angles or parallel lines with building walls, other piping and neatly spaced.
3. The horizontal runs of piping, except where concealed in partitions, shall be installed as high as possible.
4. Piping or other apparatus shall not be installed in such a manner so as to interfere with the full swing of the doors and access to other equipment.
5. The arrangement, positions and connections of pipes, fixtures, drains, valves, and the like, indicated on the drawings shall be followed as closely as possible, but the right is reserved by the General Contractor or the Engineer to change locations and elevations to accommodate the work, without additional compensation for such change.
6. Small fittings shall be screwed up close to the shoulders of male threads. Lampwick, cord, wool, or any other similar material shall not be used to make up thread joints.
7. Vertical risers shall be firmly supported by riser clamps, properly installed to relieve all weight from the fittings.

#### B. Hanger Installation

1. All piping shall be supported from the building structure by means of approved hangers and supports, to maintain proper grading and pitching of lines, to prevent vibration and to secure piping in place, and shall be so arranged as to provide for expansion and contraction.

END OF SECTION

## **HVAC Systems Performance Specifications**

### **Ayer Water/DPW Garage, Ayer, MA**

#### **HVAC**

***Garage Heating*** – The Garage space shall be heated with (3) electric unit heaters. Heaters shall be provided with mounting brackets, thermostat and disconnect. See drawings for unit heater locations and heater operating characteristics.

***Garage Ventilation*** – The garage ventilation system shall consist of (2) new exhaust fans, wall louvers, motorized dampers, CO/NOX (multi-gas) detection system and controls. See drawing for fan operating characteristics; fan, motorized damper and louver locations; and equipment sequence of controls. System shall be provided with all appurtenances as required for a complete and operational system.

## **Electrical Systems Performance Specifications**

### **Ayer Water/DPW Garage, Ayer, MA**

#### **ELECTRICAL**

##### ***Electrical Service***

A new 250amp, 120/208 volt 3 phase, 4 wire service shall be provided for new garage. The service will originate from the existing adjacent building (Grove Pond Water Treatment). Provide a new 125A/3P circuit breaker in existing panelboard 'PPA' (277/480V, 3P, 4W - manufactured by Ge, A-series). The (1) 4" and (1) 2" (secondary and telephone) underground conduits shall be provided by the electrical contractor. The cabling and conduits will enter the garage and terminate on a 250 amp, 3p, 4w main circuit breaker panelboard via a trapeze mounted 75kva transformer.

##### ***Emergency Lighting***

Emergency lighting shall consist of weatherproof wall mounted battery units. Emergency lighting levels shall be in accordance with Massachusetts State Building Code Article 780 CMR 1024.0. Exit signs shall be provided at all means of egress in accordance with 780 CMR 1023.0. Exit signs shall be clear with red letters and LED lamps.

##### ***Exterior Lighting***

Exterior Lighting shall be installed on the exterior walls to provide lighting levels as recommended by the Illuminating Engineering Society (I.E.S.). All luminaires shall have a total cutoff of all light at less than 90° from vertical (fully shielded). Reflectors of proper I.E.S. distribution shall be selected for maximum efficiency, and shall provide total cutoff of all light at the property lines. All exterior lights shall have a maximum initial horizontal foot-candle level of 8.0 footcandles, as measured directly below the luminaires at grade.

Exterior fixtures shall be controlled by a combination of timeclocks and photocells. Photocells shall turn fixtures on, and a programmable timeclock shall be provided to turn off, at a designated time..

##### ***Lighting***

Lighting shall consist of pendant mounted energy-efficient lensed LED impact resistant fixtures in the garage areas. Light fixtures shall be coordinated with garage door installer.

##### ***Power***

Provide (10) weatherproof GFI receptacles mounted at 4'-0" AFF around the interior perimeter. Each overhead door shall be provided with a 120v, 20A/1P connection with disconnect. (3) EUH(electrical unit heaters) shall each be provided with a 60Amp fused disconnect switch at the unit and a 60A/3P circuit breaker within new panelboard.

##### ***Telephone and Cable Television***

A single telephone connection shall be provided, including (1) 2" conduit into the garage from adjacent Grove Pond Water treatment building. Provide 2 2'x2'x3/4" thick plywood backboard for mounting telephone and CATV company-equipment. Provide (1) dedicated quadplex receptacle mounted to backboard..



# Appendix F

## Subsurface Data

March 7, 2016

Mr. Dan Van Schalkwyk, P.E.  
Town Engineer  
Town of Ayer - Public Works Department  
25 Brook Street  
Ayer, Massachusetts 01432  
E-mail: [dvanschalkwyk@ayer.ma.us](mailto:dvanschalkwyk@ayer.ma.us)

Cc: Mr. Mark Wetzel  
Superintendent of Public Works  
Town of Ayer  
E-mail: [mwetzel@ayer.ma.us](mailto:mwetzel@ayer.ma.us)

Subject: **Subsurface Conditions Report  
Proposed Pre-Engineered Garages  
Pirone Park & Grove Pond Water Treatment Plant  
End of School Street & Off of Barnum Road, Ayer MA  
PSI Project No.: 0446587**

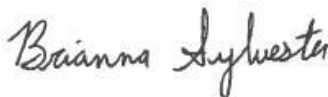
Dear Mr. Dan Van Schalkwyk:

PSI is pleased to submit this report outlining the results of the preliminary subsurface explorations at the Pirone Park and Grove Pond Water Treatment Plant sites in Ayer, Massachusetts. This work was conducted in accordance with PSI's Proposal No. 0446-171672 dated February 19, 2016.

The objective of our services was to undertake a preliminary exploration program at the two sites and summarize the subsurface conditions. The explorations and this report are not sufficient for final design purposes. During final design, when the garage location areas have been sited, it will be necessary to undertake supplemental explorations and prepare a detailed geotechnical report making specific recommendations suitable for design.

Should there be any questions regarding this preliminary report, please do not hesitate to call our office at (781) 821-2355. PSI would be pleased to continue providing geotechnical services throughout design and construction of the project, and we look forward to working with you and your organization on this and future projects.

Respectfully submitted,  
**PROFESSIONAL SERVICE INDUSTRIES, INC. (PSI)**



---

Brianna Sylvester  
Project Manager



---

Richard P. Weber, P.E.  
Principal Consultant

# PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

For the Proposed

**Proposed Pre-Engineered Garages  
Pirone Park & Grove Pond Water  
Treatment Plant  
End of School Street & Barnum Road,  
Ayer, Massachusetts**



---

Brianna Sylvester  
Project Manager

Prepared for

**Town of Ayer - Public Works Dept.  
25 Brook Street  
Ayer, Massachusetts 01432**

Prepared by

**Professional Service Industries, Inc.  
(PSI)  
480 Neponset Street, Suite 9C  
Canton, MA 02021  
Telephone: (781) 821-2355  
Fax: (781) 821-6276**



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Richard P. Weber, P.E.  
Principal Consultant

**PSI PROJECT NO. 0446587**

**March 7, 2016**



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FIGURE 2: SURFICIAL GEOLOGY

FIGURE 3: BORING LOCATION PLAN (PIRONE PARK SITE)

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## APPENDIX A

BORING LOGS

MATERIAL TEST REPORTS



# 1.0 PROJECT INFORMATION

## 1.1 PROJECT AUTHORIZATION

Authorization to proceed with this project was provided by Mr. Mark Wetzel with the Town of Ayer - Public Works Department by signing the Acceptance of Proposal contract on February 22, 2016 from PSI's Proposal No. 0446-171672.

## 1.2 PROJECT AND SITE DESCRIPTION

Project information provided to PSI included:

1. Aerial images with pins showing the approximate location of the garages
2. AutoCAD Drawings of each site

The referenced sites are located at Pirone Park at the end of School Street and the Grove Pond Water Treatment Plant off of Barnum Road, as shown in *Figure 1, USGS Site Location Plan*. At the Pirone Park site, there is an existing building and athletic fields bordered by wooded areas; the borings were located to the south of the existing building by the trailers and down the slope towards the basketball courts. At the Grove Pond Water Treatment Plant site, there is an existing building and pavement bordered by wooded areas to the north, east, and south; the boring was located at the northwest side of the site at the edge of the pavement. Refer to *Figure 3* and *Figure 4* showing the approximate locations.

PSI understands that the project consists of constructing a pre-engineered garage at each site that will be supported by shallow spread footings approximately 5 feet deep.

## 1.3 PURPOSE AND SCOPE OF WORK

The objective of the work summarized herein was to provide information on subsurface conditions for use on this project. PSI conducted a limited geotechnical exploration program at the site in conformance with generally accepted geotechnical engineering practices. The subsurface exploration program consisted of one day of drilling using Standard Penetration Test (SPT) borings to assess the depth and characteristics of the underlying material to the depths explored. The three borehole locations were placed at locations provided by Mr. Dan Van Schalkwyk, Town Engineer.

A PSI representative marked out the boring locations, observed the exploration activities, and prepared the attached soil test boring logs. The borings were advanced using a truck-mounted drill rig fitted with an automatic hammer. Standard Penetration Test (SPT) and split spoon samples were retrieved at 2-foot intervals to a depth of approximately 10 feet and at approximately 5-foot intervals, thereafter. The boreholes extended to approximately 13 feet to 22 feet below ground surface (bgs), where they encountered refusal or were terminated at the planned exploration depth. Auger refusal is defined as less than 12 inches auger penetration for one minute of drilling. Since the refusal material was not cored, the description of bedrock, boulder, or obstruction is unknown. Three soil samples were selected for laboratory testing and the remaining samples will be stored in our laboratory and disposed of after 6 months.



Soil samples and SPT N-values were obtained using a split barrel (split spoon) sampler driven with an automatic hammer in general conformance with ASTM standards. The number of hammer blows required to drive the sampler into the soil in 6-inch increments is recorded on the Boring Logs attached in the Appendix for reference. The sum of the hammer blows for the second and third interval provides the Standard Penetration Resistance (N) and is a measure of soil strength.

PSI classified the soil strata shown in the Boring Logs based upon its interpretation of the subsurface conditions. The stratifications shown on the Boring Logs represent the conditions only at the actual boring locations and variations may occur and should be expected at other locations between the boreholes. It is also possible that there could be thin layers of material lying between the sampling intervals that are not described on the logs and which might not become known until construction. Likewise, the depth to each soil stratum is considered to be approximate and may be more gradual or different in the field.

## **2.0 SUBSURFACE CONDITIONS**

### **2.1 SUBSURFACE CONDITIONS**

#### **2.1.1 LOCAL GEOLOGY**

Based on “Geologic Map of the Ayer Quadrangle, Massachusetts. Surficial Geology” compiled by Richard H. Jahns in 1953, the surficial geology of the Pirone Park project site could be terrace deposits (coarse sand and pebble to boulder gravel), kame deposits (chiefly pebble to boulder gravel with some fine to coarse sand), ground moraine (chiefly till, with minor sand and gravel), artificial fill, and local thin deposits of sand with gravel. The surficial geology of the Grove Pond Water Treatment Plant project site is terrace deposits (coarse sand and pebble to boulder gravel). This is shown in *Figure 2, Surficial Geology*. The soil encountered at the two sites generally fits the geologic description summarized above.

Based on the “Bedrock Geologic Map of Massachusetts,” compiled by Zen, E-an, Goldsmith, Richard, Ratcliffe, N.M., Robinson, Peter, Stanley, R.S., Hatch, N.L., Shride, A.F., Weed, E.G.A., and Wones, D.R. in 1983, the bedrock geology generally consists of Ayer Granite: Clinton facies (Lower Silurian), which is porphyritic biotite granite with a non-porphyritic border phase. Refusal was encountered at Boring B-2 at a depth of 13 feet bgs, however, the material was not cored to verify the classification.

#### **2.1.2 TEST BORINGS**

PSI marked out the proposed boring locations under the direction of Mr. Dan Van Schalkwyk and notified Dig Safe System, Inc. for public utility clearance prior to making the explorations at the sites. Soil Exploration Corporation of Leominster, Massachusetts conducted three soil test borings on March 3, 2016 at the approximate locations shown in *Figure 3, Boring Location Plan (Pirone Park Site)* and *Figure 4, Boring Location Plan (Water Treatment Plant Site)*.



The soil types encountered at the specific boring locations are presented as individual soil profiles and descriptions on the Boring Logs in the Appendix. The stratification presented is based on a visual assessment of the recovered soil samples and the interpretation of field logs by a PSI representative. The Standard Penetration Test values (N-values), which are shown on the Boring Logs, have been empirically correlated with various soil properties and are considered to be indicative of the relative density of cohesionless soils. A brief description of the soils encountered at the site is presented in this section. Details are shown in the logs.

### **PIRONE PARK SITE**

**TOPSOIL** – At Borings B-1 and B-2, the topsoil typically was approximately 4 inches thick. Note that the actual amount of topsoil may vary widely between boring locations.

**FILL** – An approximately 4-foot thick layer of fill was observed at the surface of Boring B-1. The general material description of the soil fill is brown, fine to coarse sand, trace to little silt, trace to little gravel, trace wood/organics. Standard Penetration Test values (N-values) are 15 blows per foot (bpf), indicating medium dense relative densities.

**GRAVELLY SAND TO SAND** – At Boring B-1, the natural material observed below the fill material is gravelly sand to sand, beginning at a depth of approximately 4 feet bgs and extending to a depth of approximately 17 feet. The general material description is brown, fine to coarse sand, trace to little silt, some gravel. The Standard Penetration Test values (N-values) range from 5 bpf to 20 bpf, indicating loose to medium dense relative densities, although the majority of the material lay in the medium dense relative density range.

**SAND TO SILTY SAND** – Sand to silty sand was encountered at Boring B-2, beginning beneath the topsoil and extending to a depth of approximately 13 feet bgs, where the boring encountered refusal. The general material description is light brown, fine to coarse sand, trace silt. Standard Penetration Test values (N-values) range from 5 bpf to 9 bpf, indicating loose relative densities.

**APPARENT BEDROCK** – Apparent bedrock was encountered at Boring B-2, resulting in an auger refusal at 13 feet bgs. The material was not cored to verify the classification of the refusal material.

### **GROVE POND WATER TREATMENT PLANT**

**FILL** – An approximately 5-foot thick layer of fill was observed at the surface of Boring B-3. The general material description of the soil fill is brown, fine to coarse sand, trace to little silt, some gravel. Standard Penetration Test values (N-values) range from 8 bpf to 17 bpf, indicating loose to medium dense relative densities.

**GRAVELLY SAND TO SAND** – At Boring B-3, the natural material observed below the fill material is gravelly sand to sand, beginning at a depth of approximately 5 feet bgs and extending to a depth of approximately 22 feet bgs. The general material description is brown, fine to coarse sand, trace to little silt, some gravel. The Standard Penetration Test values (N-



values) range from 17 bpf to 49, indicating medium dense to dense relative densities, although the majority of the material lay in the medium dense relative density range.

## 2.2 GROUNDWATER CONDITIONS

The depth to groundwater was observed at the time the explorations were made and is shown in the following table. Groundwater was only observed at Boring B-1 at the Pirone Park site at the time of drilling. The elevation is based on a review of the AutoCAD Drawing provided to PSI. For safety purposes, all of the borings were backfilled at the time of drilling completion.

Location	Approximate Depth (ft.) of Groundwater	Approximate Elevation of Groundwater
Boring B-1	5 feet bgs	El. 82.5

The observation represents the groundwater condition at the time of measurement and may not be indicative of other times. The level of groundwater below the ground surface fluctuates based on conditions such as season, temperature, and amount of precipitation that might be different from the time when the observations were made. Therefore, the groundwater levels can be higher or lower during construction and during the life of the structure. This fact must be taken into consideration when preparing foundation design and developing earthwork procedures.

## 2.3 SOIL LABORATORY TESTING

PSI performed three moisture content and gradation tests on the samples at Boring B-1 (2 to 4 feet bgs), Boring B-2 (2 to 4 feet bgs), and Boring B-3 (2 to 4 feet bgs) to assist in classifying the material and determining the percent fines (percent passing the Number 200 sieve). The material test reports for the samples are located in the Appendix of this report and summarized in the following tables.

Gradation Test Results – Boring B-1 (2 to 4 feet bgs)	
Moisture Content (%)	13.2
% Passing No. 200 Sieve	9.8
USCS Classification	Poorly-Graded Sand with Silt and Gravel (SP-SM)

Gradation Test Results – Boring B-2 (2 to 4 feet bgs)	
Moisture Content (%)	4.6
% Passing No. 200 Sieve	4.9
USCS Classification	Poorly-Graded Sand (SP)

Gradation Test Results – Boring B-3 (2 to 4 feet bgs)	
Moisture Content (%)	6.4
% Passing No. 200 Sieve	11
USCS Classification	Well-Graded Sand with Silt and Gravel (SW-SM)





### **3.0 GEOTECHNICAL RISK**

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. Site exploration identifies actual subsurface conditions only at those points where samples are taken.

A geotechnical report is based on conditions that existed at the time of the subsurface exploration. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience.

### **4.0 REPORT LIMITATIONS**

Professional Service Industries, Inc.'s professional services have been performed and our findings presented in accordance with generally accepted geotechnical engineering principles and practices. Professional Service Industries, Inc. is not responsible for the conclusions, opinions, or recommendations made by others based on this data. No other warranties are implied or expressed.

The scope of explorations was intended to assess the soil conditions. No engineering analyses and recommendations were submitted in this report.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our Client.

Professional Service Industries, Inc. did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminate in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Site conditions are outside of PSI's control, and mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, Professional Service Industries, Inc. cannot and shall not be held responsible of the occurrence or recurrence of mold amplification.



# **FIGURES**

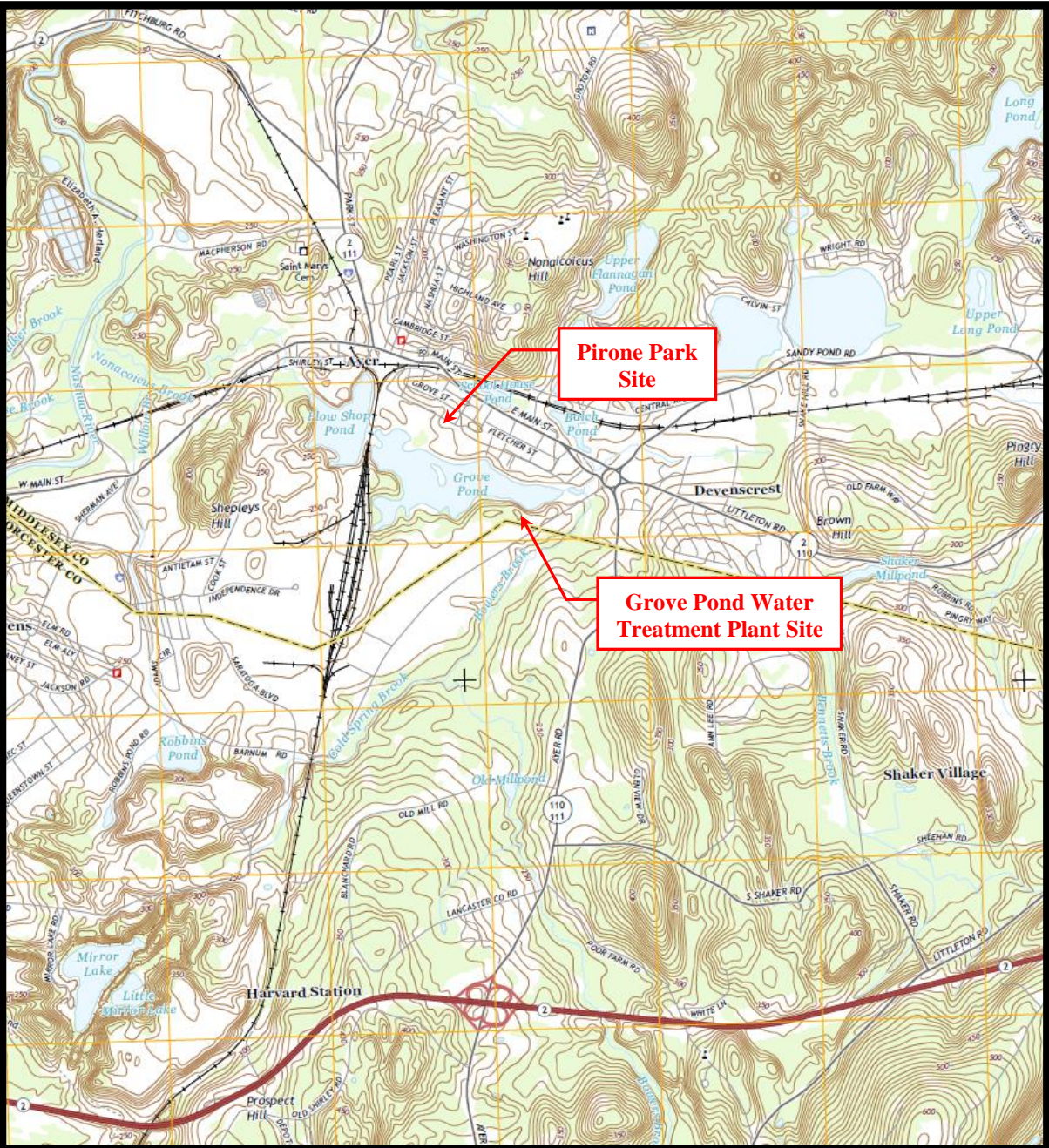
**Figure 1: USGS Site Location Plan**

**Figure 2: Surficial Geology**

**Figure 3: Boring Location Plan (Pirone Park Site)**

**Figure 4: Boring Location Plan (Water Treatment Plant Site)**




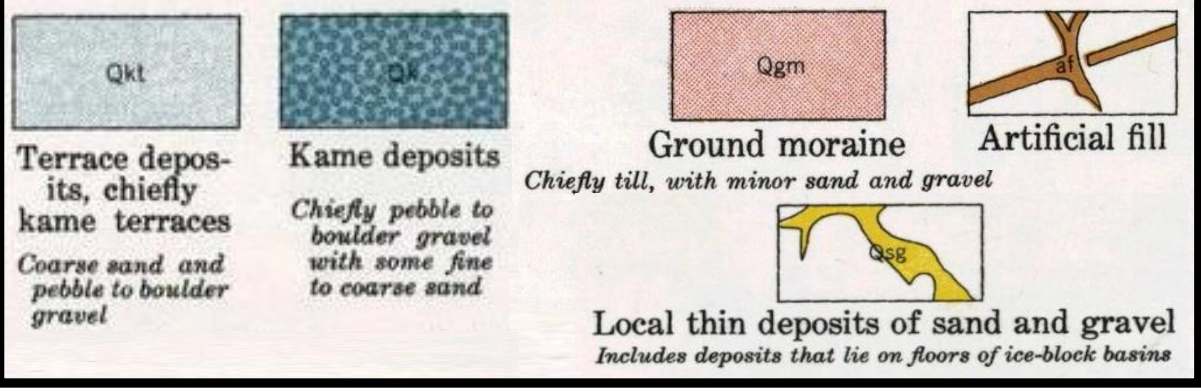
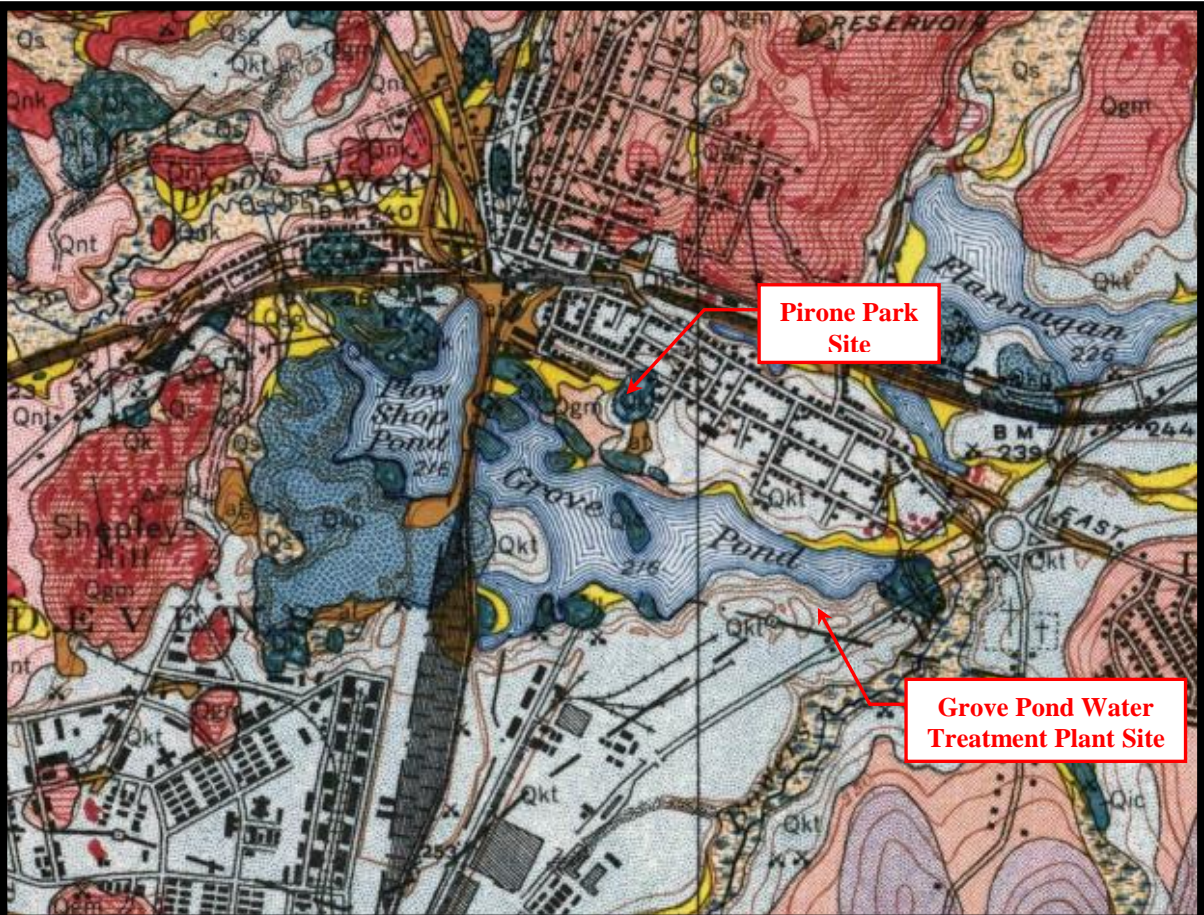


REFERENCE: U.S.G.S. "AYER, MA" 7.5' QUADRANGLE MAP  
 ISSUED: 2015  
 REVISED:

**FIGURE 1: USGS SITE LOCATION PLAN**

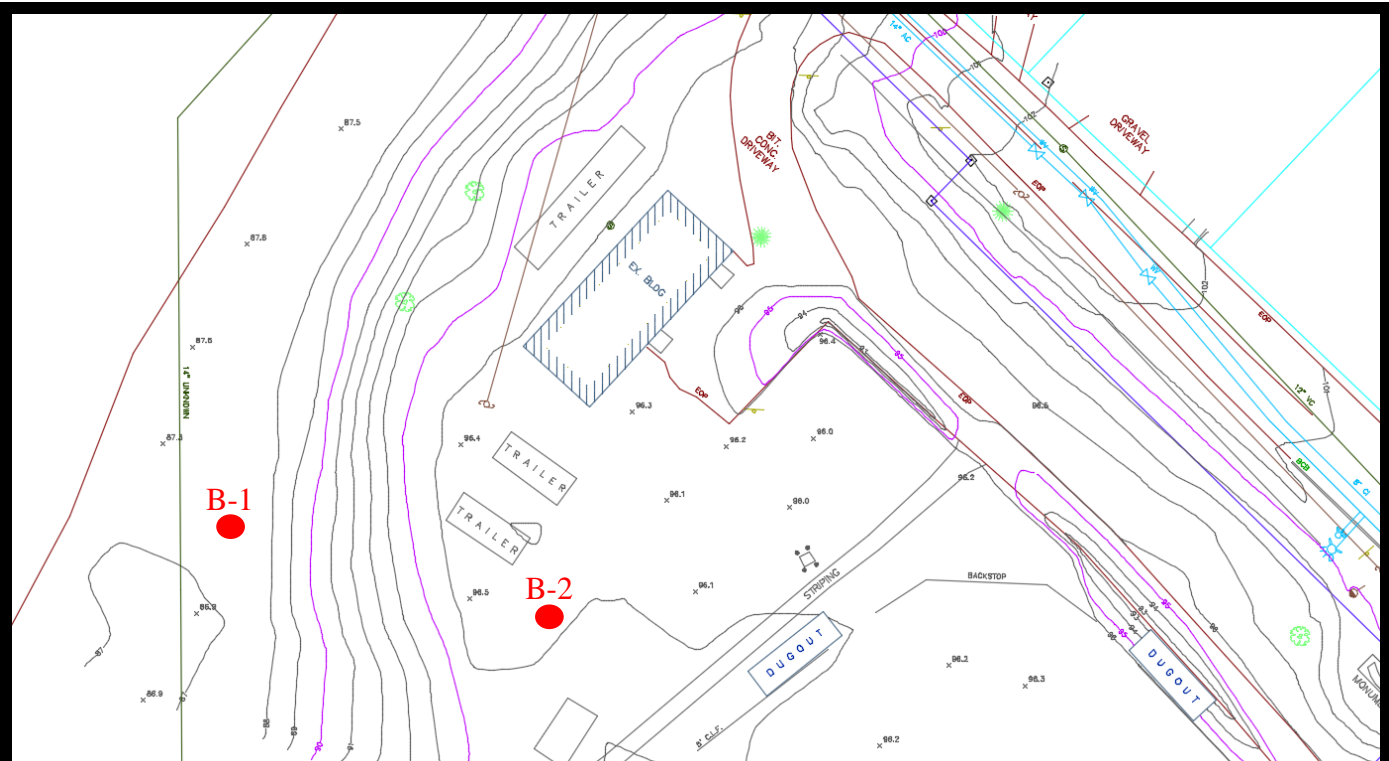
**PROJECT NAME:**  
 Proposed Pre-Engineered Garages  
 Pirone Park & Grove Pond Water Treatment Plant  
 School Street & Barnum Road, Ayer MA 01432

	PSI Project No.	Date	Scale
	0446587	March 2016	N.T.S.



**REFERENCE:** "Geologic Map of the Ayer Quadrangle, Massachusetts. Surficial Geology"  
Richard H. Jahns - 1953

<b>FIGURE 2: SURFICIAL GEOLOGY</b>		<b>PSI Project No.</b>	<b>Date</b>	<b>Scale</b>
		0446587	March 2016	N.T.S.
<b>PROJECT NAME:</b> Proposed Pre-Engineered Garages Pirone Park & Grove Pond Water Treatment Plant School Street & Barnum Road, Ayer MA 01432				



● Boring Location



**FIGURE 3: BORING LOCATION PLAN  
PIRONE PARK SITE**

**PSI Project No.**

**Date**

**PROJECT:**

Proposed Pre-Engineered Garages  
Pirone Park & Grove Pond Water Treatment Plant  
School Street & Barnum Road, Ayer MA

0446587

March 2016





**FIGURE 4: BORING LOCATION PLAN  
WATER TREATMENT PLANT SITE**

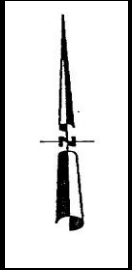
**PSI Project No.**

**Date**

**PROJECT:**  
Proposed Pre-Engineered Garages  
Pirone Park & Grove Pond Water Treatment Plant  
School Street & Barnum Road, Ayer MA

0446587

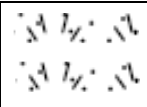



March 2016



# APPENDIX

## Boring Logs

### Legend for Graphic Log

	<b>Topsoil</b>
	<b>Fill</b>
	<b>Gravelly Sand to Sand</b>
	<b>Sand to Silty Sand</b>

**DATE STARTED:** 3/3/16  
**DATE COMPLETED:** 3/3/16  
**COMPLETION DEPTH:** 20.0 ft  
**BENCHMARK:** N/A  
**ELEVATION:** N/A  
**LATITUDE:**  
**LONGITUDE:**  
**STATION:** N/A    **OFFSET:** N/A  
**REMARKS:**

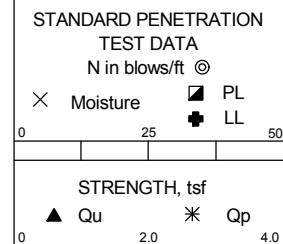
**DRILL COMPANY:** Soil Exploration Corp.  
**DRILLER:** George Guinto    **LOGGED BY:** PSI, Inc.  
**DRILL RIG:** Truck-Mounted Rig  
**DRILLING METHOD:** Hollow Stem Auger  
**SAMPLING METHOD:** SS  
**HAMMER TYPE:** Automatic  
**EFFICIENCY:** N/A  
**REVIEWED BY:** Brianna Sylvester

# BORING B-1

**Water**    ▽ While Drilling    5 feet  
 ▼  
 ▼

**BORING LOCATION:**  
 Pirone Park

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						4" of topsoil					
	0			1	22	Medium dense, brown, fine to coarse sand, trace to little silt, trace gravel, trace wood/organics (fill)		5-8-7-7 N=15	⊙		
	1			2	17	Medium dense, brown, fine to coarse sand, trace to little silt, little gravel, trace wood/organics (fill)		6-6-9-8 N=15	⊙		
	5			3	9	Medium dense, brown, fine to medium coarse sand, trace to little silt, some gravel		6-6-8-12 N=14	⊙		
	2			4	9	Medium dense, fine to coarse sand, trace to little silt, some gravel		7-10-10-8 N=20	⊙		
	10			5	10	Medium dense, fine to medium coarse sand, trace silt, some fine gravel		9-8-5-10 N=13	⊙		
	15			6	16	Loose, brown, fine to medium coarse sand, trace silt, some fine gravel		6-2-3-3 N=5	⊙		
	20					Running sands, couldn't take split spoon sample					



Professional Service Industries, Inc.  
 480 Neponset Street, Suite 9C  
 Canton, MA 02021  
 Telephone: (781) 821-2355

**PROJECT NO.:** 0446587  
**PROJECT:** Pre-Engineered Garages  
**LOCATION:** Pirone Park & Grove Pond Water Treatment Plant - Ayer, MA









**DATE STARTED:** 3/3/16  
**DATE COMPLETED:** 3/3/16  
**COMPLETION DEPTH:** 13.0 ft  
**BENCHMARK:** N/A  
**ELEVATION:** N/A  
**LATITUDE:**  
**LONGITUDE:**  
**STATION:** N/A    **OFFSET:** N/A  
**REMARKS:**

**DRILL COMPANY:** Soil Exploration Corp.  
**DRILLER:** George Guinto  
**LOGGED BY:** PSI, Inc.  
**DRILL RIG:** Truck-Mounted Rig  
**DRILLING METHOD:** Hollow Stem Auger  
**SAMPLING METHOD:** SS  
**HAMMER TYPE:** Automatic  
**EFFICIENCY:** N/A  
**REVIEWED BY:** Brianna Sylvester

# BORING B-2

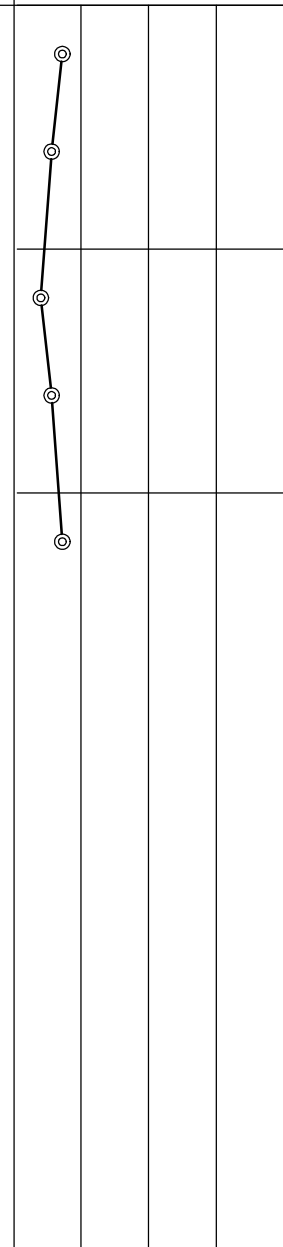
**Water**  Dry  
  


**BORING LOCATION:**  
 Pirone Park

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ©	Additional Remarks
0						4" of topsoil					
				1	14	Loose, light brown, fine to coarse sand, trace silt		3-4-5-4 N=9			
				2	16	Loose, light brown, fine to coarse sand, trace silt, trace fine gravel		4-3-4-4 N=7			
5				3	14	Loose, light brown, fine to coarse sand, trace silt		2-2-3-4 N=5			
				4	17	Loose, light brown, fine to coarse sand, trace silt		4-4-3-6 N=7			
10				5	15	Loose, light brown, fine to coarse sand, trace silt		3-3-6-11 N=9			
						Refusal at 13'					

**STANDARD PENETRATION TEST DATA**  
 N in blows/ft ©  
 X Moisture    □ PL  
                   + LL  
 0                    25                    50

**STRENGTH, tsf**  
 ▲ Qu                    \* Qp  
 0                    2.0                    4.0



Professional Service Industries, Inc.  
 480 Neponset Street, Suite 9C  
 Canton, MA 02021  
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
**PROJECT NO.:** 0446587  
**PROJECT:** Pre-Engineered Garages  
**LOCATION:** Pirone Park & Grove Pond Water Treatment Plant - Ayer, MA

The stratification lines represent approximate boundaries. The transition may be gradual.


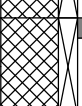
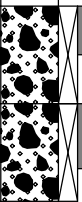


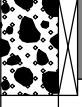

**DATE STARTED:** 3/3/16  
**DATE COMPLETED:** 3/3/16  
**COMPLETION DEPTH:** 22.0 ft  
**BENCHMARK:** N/A  
**ELEVATION:** N/A  
**LATITUDE:**  
**LONGITUDE:**  
**STATION:** N/A    **OFFSET:** N/A  
**REMARKS:**

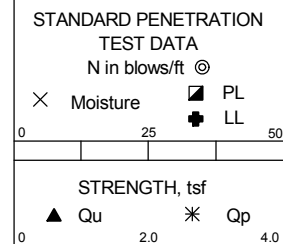
**DRILL COMPANY:** Soil Exploration Corp.  
**DRILLER:** George Guinto  
**LOGGED BY:** PSI, Inc.  
**DRILL RIG:** Truck-Mounted Rig  
**DRILLING METHOD:** Hollow Stem Auger  
**SAMPLING METHOD:** SS  
**HAMMER TYPE:** Automatic  
**EFFICIENCY:** N/A  
**REVIEWED BY:** Brianna Sylvester

# BORING B-3

**Water:**    Dry

**BORING LOCATION:**  
 Grove Pond Water Treatment Plant

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0	0			1	10	Medium dense, brown, fine to coarse sand, trace to little silt, some gravel (fill)		9-9-8-7 N=17	○		
	5			2	5	Loose, brown, fine to coarse sand, trace to little silt, some gravel (fill)		4-4-4-12 N=8	○		
5	5			3	12	Medium dense, brown, fine to coarse sand, trace to little silt, some gravel		7-6-11-15 N=17	○		
	10			4	16	Medium dense, brown, fine to coarse sand, trace to little silt, some gravel		16-15-13-12 N=28	○		
	15			5	5	Dense, brown, fine to coarse sand, trace to little silt, some gravel		30-29-20-22 N=49	○		
	20			6	20	Medium dense, brown, fine to coarse sand, trace to little silt, some gravel		15-12-11-12 N=23	○		
	25			7	5	Medium dense, brown, fine to coarse sand, trace to little silt, some gravel		16-12-12-12 N=24	○		



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**PROJECT NO.:** 0446587  
**PROJECT:** Pre-Engineered Garages  
**LOCATION:** Pirone Park & Grove Pond Water Treatment Plant - Ayer, MA

# FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

## COHESIONLESS SOILS

(Silt, Sand, Gravel and Combinations)

### Density

Very Loose	4 blows per foot or less
Loose	5 - 10 blows per foot
Medium Dense	11 - 30 blows per foot
Dense	31 - 50 blows per foot
Very Dense	51 blows per foot or more

### Relative Properties

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

### Particle Size Identification

Boulders	8 inch diameter or more
Cobbles	3 - 8 inch diameter
Gravel	Coarse 1 - 3 inches
	Medium 1/2 - 1 inch
	Fine 1/4 - 1/2 inch
Sand	Coarse 0.6 mm - 1/4 inch (diameter of pencil lead)
	Medium 0.2 mm - 0.6 mm (diameter of broom straw)
	Fine 0.05 mm - 0.2 mm (diameter of human hair)
Silt	0.002 mm - 0.05 mm (cannot see particles)

## COHESIVE SOILS

(Clay, Silt and Combinations)

### Consistency

Very soft	2 blows per foot or less
Soft	3 - 4 blows per foot
Medim Stiff	5 - 8 blows per foot
Stiff	9 - 15 blows per foot
Very Stiff	16 - 30 blows per foot
Hard	31 blows per foot or more

### Plasticity

Degree of Plasticity	Plasticity Index
None to slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to very high	over 22

### CLASSIFICATION ON LOGS ARE MADE BY VISUAL EXAMINATION OF SAMPLES.

**Standard Penetration Test** Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 2.0 feet into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. The number of hammer blows required to drive the sampler into the soil in 6-inch increments is recorded. The sum of the hammer blows for the second and third interval provides the Standard Penetration Resistance (N) and is a measure of soil strength. The reader is referenced to ASTM D1586.

**Strata Changes** Boundaries between soil layers are considered approximate based upon observed changes during the drilling operations or noted changes within representative samples.

**Groundwater** Observations were made to determine either the depth or elevation of water at the times indicated on the Soil Exploration Logs. The water so encountered may be groundwater or perched water. The depth or elevations indicated for water may fluctuate due to seasonal changes or other unknown factors.

## Material Test Reports





Professional Service Industries, Inc.  
480 Neponset Street, Suite 9C  
Canton, MA 02021

Phone: (781) 821-2355  
Fax: (781) 821-6276

# Material Test Report

Report No: MAT:0446587-1-S1

Issue No: 1

Client: TOWN OF AYER  
25 BROOK STREET  
AYER, MA 01432

Project: PRE-ENGINEERED GARAGES-AYER  
MA  
AYER, MA

These test results apply only to the specific locations and materials noted and may not represent any other locations or elevations. This report may not be reproduced, except in full, without written permission by Professional Service Industries, Inc. If a non-compliance appears on this report, to the extent that the reported non-compliance impacts the project, the resolution is outside the PSI scope of engagement.

Approved Signatory: Yannick Lastennet (Department Manager)  
Date of Issue: 3/4/2016

## Sample Details

Sample ID: 0446587-1-S1      Soil Description:

Client Sample ID:

Date Sampled: 03/03/16

Sampled By: Brianna Sylvester

Specification: No spec. seive

Supplier:

Source: On-Site

Material:

Sampling Method:

General Location:

Location: B-1 S2, (2' - 4')

Lift:

## Particle Size Distribution

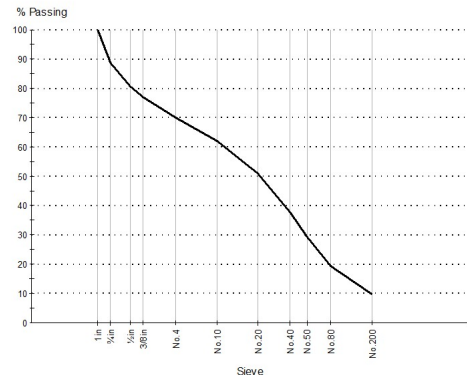
Method: ASTM C 136, ASTM C 117  
Drying by: Oven  
Date Tested: 3/4/2016

Sieve Size	% Passing	Limits
1in (25.0mm)	100	
¾in (19.0mm)	89	
½in (12.5mm)	81	
3/8in (9.5mm)	77	
No.4 (4.75mm)	70	
No.10 (2.0mm)	62	
No.20 (850µm)	51	
No.40 (425µm)	38	
No.50 (300µm)	29	
No.80 (180µm)	19	
No.200 (75µm)	9.8	

## Other Test Results

Description	Method	Result	Limits
Curvature Coefficient	ASTM C 136, ASTM C 117	0.73	
Uniformity Coefficient		22.53	
Tested By		Gary Brooks	
Moisture content (%)	ASTM D 2216	13.2	
Method		B	
Tested By		Gary Brooks	
Date Tested		3/3/2016	

## Chart



## Comments

N/A



Professional Service Industries, Inc.  
480 Neponset Street, Suite 9C  
Canton, MA 02021

Phone: (781) 821-2355  
Fax: (781) 821-6276

# Material Test Report

Report No: MAT:0446587-1-S2

Issue No: 1

Client: TOWN OF AYER  
25 BROOK STREET  
AYER, MA 01432

CC:

Project: PRE-ENGINEERED GARAGES-AYER  
MA  
AYER, MA

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Approved Signatory: Yannick Lastennet (Department Manager)  
Date of Issue: 3/4/2016

## Sample Details

Sample ID: 0446587-1-S2      Soil Description:

Client Sample ID:

Date Sampled: 03/03/16

Sampled By: Brianna Sylvester

Specification: No spec. seive

Supplier:

Source: On-Site

Material:

Sampling Method:

General Location:

Location: B-2 S2, (2' - 4')

Lift:

## Particle Size Distribution

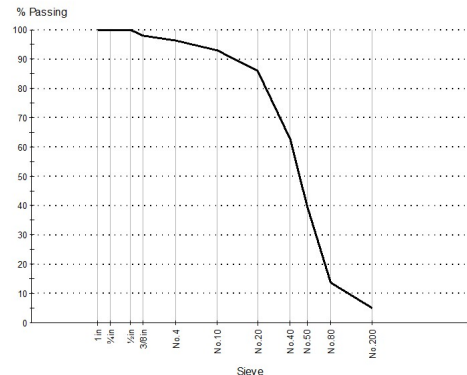
Method: ASTM C 136, ASTM C 117  
Drying by: Oven  
Date Tested: 3/4/2016

Sieve Size	% Passing	Limits
1in (25.0mm)	100	
¾in (19.0mm)	100	
½in (12.5mm)	100	
3/8in (9.5mm)	98	
No.4 (4.75mm)	96	
No.10 (2.0mm)	93	
No.20 (850µm)	86	
No.40 (425µm)	63	
No.50 (300µm)	40	
No.80 (180µm)	14	
No.200 (75µm)	4.9	

## Other Test Results

Description	Method	Result	Limits
Curvature Coefficient	ASTM C 136, ASTM C 117	1.19	
Uniformity Coefficient		3.26	
Tested By		Gary Brooks	
Moisture content (%)	ASTM D 2216	4.6	
Method		B	
Tested By		Gary Brooks	
Date Tested		3/3/2016	

## Chart



## Comments

N/A



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Canton, MA 02021

Phone: (781) 821-2355  
Fax: (781) 821-6276

# Material Test Report

Report No: MAT:0446587-1-S3

Issue No: 1

Client: TOWN OF AYER  
25 BROOK STREET  
AYER, MA 01432

CC:

Project: PRE-ENGINEERED GARAGES-AYER  
MA  
AYER, MA

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Approved Signatory: Yannick Lastennet (Department Manager)  
Date of Issue: 3/4/2016

## Sample Details

Sample ID: 0446587-1-S3      Soil Description:

Client Sample ID:

Date Sampled: 03/03/16

Sampled By: Brianna Sylvester

Specification: No spec. seive

Supplier:

Source: On-Site

Material:

Sampling Method:

General Location:

Location: B-3 S2, (2' - 4')

Lift:

## Particle Size Distribution

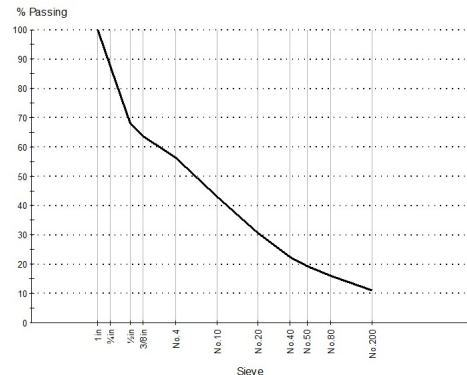
Method: ASTM C 136, ASTM C 117  
Drying by: Oven  
Date Tested: 3/4/2016

Sieve Size	% Passing	Limits
1in (25.0mm)	100	
¾in (19.0mm)	87	
½in (12.5mm)	68	
3/8in (9.5mm)	64	
No.4 (4.75mm)	56	
No.10 (2.0mm)	43	
No.20 (850µm)	31	
No.40 (425µm)	22	
No.50 (300µm)	19	
No.80 (180µm)	16	
No.200 (75µm)	11	

## Other Test Results

Description	Method	Result	Limits
Curvature Coefficient	ASTM C 136, ASTM C 117	1.57	
Uniformity Coefficient		110.16	
Tested By		Gary Brooks	
Moisture content (%)	ASTM D 2216	6.4	
Method		B	
Tested By		Gary Brooks	
Date Tested		3/3/2016	

## Chart



## Comments

N/A





