

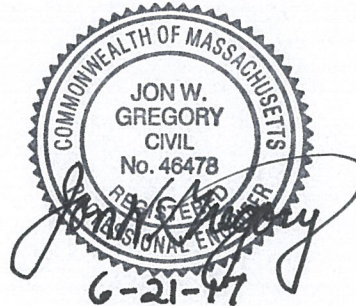
**TOWN OF BARNSTABLE**  
**DEPARTMENT OF PUBLIC WORKS**  
**WATER SUPPLY DIVISION**

**INVITATION FOR BID**  
**Project Manual**

**REHABILITATION OF THE MARY DUNN NO. 1 WATER  
STORAGE TANK AND TANK SITE IMPROVEMENTS**  
**CONTRACT NO.: 16-17-03**



**Consulting Engineer: Tata & Howard, Inc.**



**Issued: June 21, 2017**

**Bids Due: July 18, 2017, 2 pm**

**Last Date for Questions: July 11, 2017, Noon**

**Pre-bid Meeting – July 7, 2017, 9 am**  
**47 Old Yarmouth Road, Hyannis, MA**

**Contact: Johanna Boucher, 508-862-4741 [johanna.boucher@town.barnstable.ma.us](mailto:johanna.boucher@town.barnstable.ma.us)**

This document and any addenda thereto are issued electronically only. It is the responsibility of every bidder who receives this bid and all associated documents to check the Town of Barnstable Bid & RFP System ([www.town.barnstable.ma.us](http://www.town.barnstable.ma.us)) for any addenda or modification to this solicitation, if they intend to respond. The Town of Barnstable accepts no liability to provide accommodation to bidders who submit a response based upon an out of date solicitation document. Bidders may not alter (manually or electronically) the bid language or any bid documents. Unauthorized modifications to the body of the bid, specifications, terms or conditions, or which change the intent of this bid are prohibited and may disqualify a response.

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SECTION 00020

INVITATION FOR BID

The Department of Public Works, is requesting bids for the following:

**REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK  
AND TANK SITE IMPROVEMENTS**

Sealed General Contract bids will be received at the Town of Barnstable, Chief Procurement Officer, 230 South Street, Hyannis, MA 02601 until 2:00 PM (EST), July 18, 2017.

The work to be performed under the Base Bid of this contract includes, but is not limited to rehabilitation and site improvements at the Mary Dunn No. 1 Water Storage Tank, a 0.37 million gallon riveted steel standpipe. Tank rehabilitation includes demolition of the existing wood and rolled asphalt tank roof, support structures, and center rigging post assembly, furnishing and installing a new factory coated, FAA compliant, aluminum geodesic dome roof with appurtenances including new finial vent, two (2) roof access hatches, safety handrails, and roof ladder with fall arrest cable system; rivet repair and steel overlap seam repair of the tank walls; reconditioning of the tank foundation concrete ringwall, and miscellaneous repairs including modification of the existing overflow pipe, removal of existing access ladder and cage, and furnishing and installing a new access ladder, cage, ladder security gate, and safety climb device. Tank site improvements include furnishing and installing new fence and double gate, relocating existing pedestrian gate and portions of existing fence, install new FOB Reader mount for pedestrian gate, furnishing and installing barbed wire on portions of existing fence, electric barrier gate and FOB Reader mounts, modifications to the existing SCADA antenna mount and conduit, and associated SCADA integration, FOB integration, loam and seed and crushed stone ground cover, gravel access road and associated improvements to the entrance at Mary Dunn Road.

Alternate 1 includes paving the access road.

Construction may begin on September 5<sup>th</sup>, 2017, but the tank must remain in service until September 15, 2017, and be back in service on November 15<sup>th</sup>, 2017. Project must be complete by May 1, 2018.

Estimated cost of the contract is \$630,000.

Bids shall be in a sealed envelope bearing the words:

“TOWN OF BARNSTABLE –REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE  
TANK AND TANK SITE IMPROVEMENTS”

To receive consideration, proposals shall be submitted no later than the above date and time for the opening.

Bid specifications may be obtained on the Town of Barnstable Website, Bid & RFP System at [www.town.barnstable.ma.us](http://www.town.barnstable.ma.us) immediately. All bidders must register on the Bid & RFP System to receive documents. Contact Johanna Boucher, 508-862-4741, [johanna.boucher@town.barnstable.ma.us](mailto:johanna.boucher@town.barnstable.ma.us).

The successful bidder will be required to furnish a Labor and Materials Payment Bond and a Performance Bond each in the amount of one hundred percent (100%) of the contract amount.

To receive consideration, proposals shall be submitted on the appropriate forms no later than the above date and time schedule for the opening. Proposals must be accompanied by a bid security in the amount

Rehabilitation of the Mary  
Dunn No. 1 Water Storage Tank  
and Tank Site Improvements

INVITATION FOR BID  
00020-1

Barnstable, Massachusetts  
Contract No. 16-17-03

of five percent (5%) of the Bid Price in the form of a bid bond or certified, treasurer's or cashier's check issued by a responsible bank or trust company. If, upon acceptance of the bid, a Bidder fails to enter into a Contract with the Town of Barnstable, the bid security shall be forfeited to and become the property of the Town.

A mandatory pre-bid meeting will take place at 9:00 AM (EST), on July 7, 2017 at the Water Supply Division conference room, 47 Old Yarmouth Road, Hyannis, MA 02601, to be followed by a site visit.

Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) policies of the Town of Barnstable are applicable. The "Fair Share" construction goal for this project is a minimum of **10.4%** combined MBE/WBE participation by state certified MBEs and WBEs. Within five days after the Bid Opening, the Bidder shall submit a "Schedule for Participation by Minority Business Enterprises" with accompanying Letters of Intent by each minority subcontractor proposed to be used by the Bidder. The Bidder shall submit a "Schedule for Participation by Women Business Enterprises" with accompanying Letters of Intent by each WBE subcontractor to be used by the Bidder. The Letters of Intent shall include, among other things, the contract items the M/WBE is proposing to perform and the prices that the M/WBE proposed to charge for the work. Original signed copies of the letters will be required prior to the signing of a contract. The Schedule of Participation shall list these M/WBE subcontractors with whom the Contractor intends to contract and state the total price to be paid each M/WBE contractor as taken from each Letter of Intent submitted with the bid. The Bidder shall submit a copy of current SBA letter of Minority Business Enterprise or Women Business Enterprise Certification for each subcontractor. Failure to comply with the requirements of this paragraph may be deemed to render a proposal non-responsive.

Full compliance with Federal, State and Municipal Wage Laws is required of all work done for the Town of Barnstable. Minimum Wage Rates as determined by the Commissioner of Department of Labor and Industries under the provision of the Massachusetts General Laws, Chapter 149, Section 26 to 27D, as amended, apply to this project. It is the responsibility of the contractor, before bid opening, to request if necessary, any additional information on Minimum Wage Rates for those trades people who may be employed for the proposed work under this contract.

All bidders shall be required to provide Certification of Occupational Safety and Health Administration (OSHA) Training in accordance with Massachusetts General Law 30: Section 39S, as amended by Chapter 306 of the Acts of 2004, effective 7/1/06.

Bidders are not to include in their Bid Proposal sales and compensating use taxes on materials and supplies purchased for this project. All materials used are tax exempt.

Contractors shall be required to comply with all applicable Massachusetts General Laws, Chapter 30 S.39M, and other applicable Massachusetts General Laws.

A weekly certified payroll submittal shall be required of the successful bidder in accordance with MGL C149, S27B. No payments will be made by the Town until all payroll information necessary for the Town to determine compliance with prevailing wage law requirements for the time period of the payment request have been submitted.

The Contractor shall not discriminate with regard to the personnel employed on this project on the basis of race, color, creed, national origin, gender, sexual preference, handicap or age.

A copy of this advertisement is available on the Massachusetts Newspaper Publishers Association (MNPA) website (<http://masspublicnotices.org/>).

The Town of Barnstable reserves the right to reject any or all proposals or waive any formalities that appear to be in the best interest of the Town. A proposal which includes, for any item, a bid that is abnormally low or high may be rejected as unbalanced. The right is also reserved to accept any proposal deemed to be best for the Town of Barnstable. In any event, bids to be deemed acceptable shall comply in each and every way with all applicable Massachusetts General Laws.

All inquiries with respect to this Invitation to Bid and the Contract Documents, including the Plans and Specifications, must be in writing to the Chief Procurement Officer at: [johanna.boucher@town.barnstable.ma.us](mailto:johanna.boucher@town.barnstable.ma.us).

END OF SECTION

## SECTION 00100

### INSTRUCTIONS TO BIDDERS

#### 1. SECURING DOCUMENTS

- A. The Invitation for Bid, Instructions to Bidders, General Conditions, Special Conditions, Bid Drawings and Specifications, all Addenda issued prior to the execution of the Owner-Contractor Agreement, Performance and Labor and Materials Payment Bonds, all amendments, Change Orders and written interpretations of the Contract Documents issued by the Town, Labor Rates, completed Bid Proposal and supporting forms signed and submitted by the Contractor, Applications and Certification for Payment, Owner-Contractor Agreement and all other documents in these Project Specifications and Drawings referenced in the Agreement compose the Contract Documents.
- B. All questions regarding this invitation to bid should be addressed to Johanna Boucher, Purchasing, email address is: [johanna.boucher@town.barnstable.ma.us](mailto:johanna.boucher@town.barnstable.ma.us). All bid documents are available on Town of Barnstable's website on the Bid & RFP System at [www.town.barnstable.ma.us](http://www.town.barnstable.ma.us)

#### 2. BID FORMS

- A. All bids must be submitted on the forms bound herein. All blank spaces in the proposal form shall be properly completed in ink and all erasures and corrections initialed by the contractor.
- B. All bids must be submitted to the above address in a sealed envelope containing the bid, properly marked "**TOWN OF BARNSTABLE: REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK AND TANK SITE IMPROVEMENTS**". It is the responsibility of the bidder to ensure that bids are delivered to the specified location prior to the time and date designated.
- C. The Town may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids, except as limited under the General Laws, Chapters 30 and 149, applicable sections, as amended to date.
- D. Any bid received after the time and date designated will not be considered.

#### 3. BID SECURITY

- A. Bid Security in the amount of **FIVE PERCENT (5%) of the bid dollars** (this includes all alternates, if any included in this bid) shall accompany each bid submittal. At the option of the Bidder, the security may be a bid bond issued by a surety authorized to do business in the Commonwealth, certified check, or treasurer's or cashier's check issued by a responsible bank or trust company, payable to the Town of Barnstable. Personal or business checks will not be accepted.
- B. The bid security shall secure the execution of the Contract.



- C. Should any bidder to whom an award is made fail to enter into a Contract therefore within ten (10) days, Saturdays, Sundays, and legal holidays excluded, after notice of award has been mailed to him or fail within such time to furnish Performance and Payment Bonds as required, the amount so received from such bidder through their bond, certified check, treasurer's or cashier's check as bid deposit shall become the property of the Town of Barnstable, as liquidated damages; provided that the amount of the bid deposit which becomes the property of the Town of Barnstable shall not, in any event, exceed the difference between their bid price and the bid price of the next lowest responsible and eligible bidder; and that provided further that in the case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other unforeseen circumstances affecting the bidder, their deposit shall be returned to them.
- D. Bid deposits of the three lowest responsible and eligible bidders will be held by the Awarding Authority during the time stipulated for the execution of the contracts and the submission of the performance bonds, and may be disposed of in such a manner as will accomplish the purpose for which they are submitted. After expiration of such period, bid guarantees not disposed, or the amounts thereof, will be returned within five (5) days, Saturdays, Sundays and legal holidays excluded.

#### **4. DEFINITIONS**

- A. All definitions set forth in the General Conditions are applicable to all bidding documents, which include the Advertisement, Instructions to Bidders, Addenda issued prior to receipt of general bids.
- B. Addenda are written or graphic instruments issued prior to the execution of the contract which modify or interpret the bidding documents, including drawings and specifications, by additions, deletions, clarifications or corrections. Addenda will become part of the Contract Documents upon execution of the Agreement.

#### **5. BIDDER'S REPRESENTATION**

- A. Each bidder, in submitting their proposal, represents that they have read and understand the bidding documents, reports, test results, drawings, or other such documents provided by the Town pursuant to this bid.
- B. Each bidder represents that they have visited the site, familiarized themselves with the local conditions under which the work is to be performed, compared the site with the drawings and specifications, satisfied themselves of the conditions of delivery, handling and storage of materials, and all other matters that may be incidental to the work that may affect: 1) the cost, progress or performance of the work; 2) the means, methods, techniques, sequences and procedures of construction; and 3) the bidder's safety precautions and programs, before submitting their proposal.
- C. Each bidder agrees at the time of submitting its bid that 1) the bidding documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the work; and 2) no further examinations, investigations, explorations, tests, studies or data are necessary for the determination of its bid for performance of the work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the bidding documents.

- D. Each bidder is familiar with all federal, state and local laws and regulations that may affect cost, progress or performance of the work.
- E. Each bidder represents that their bid is based upon the materials and equipment described in the bidding documents, including any addenda issued thereto.
- F. The submission of a bid will constitute an incontrovertible representation by the bidder that: 1) the bidder has complied with every requirement of this Section; 2) without exception, the bid submitted is premised upon performing and furnishing the work required by the bidding documents and applying any specific means, methods, techniques, sequences and procedures of construction that may be shown or indicated or expressly required by the bidding documents; 3) the bidder has given the Town written notice of all conflicts, errors, ambiguities and discrepancies that the bidder has discovered in the bidding documents and the written resolutions thereof by the Town are acceptable to the bidder; and 4) the bidding documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the work. No allowance will subsequently be made to the successful bidder by reason of any error or omission on his part, due to his neglect in complying with the requirements of this article, except with respect to conflicts with the General Laws.

## **6. EXAMINATION OF BIDDING DOCUMENTS**

Each bidder shall examine the bidding documents carefully and, not later than seven (7) days prior to the date for receipt of bids, shall make a written request to the Chief Procurement Officer for interpretation or correction of any ambiguity, inconsistency or error therein which they may discover. Any interpretation or correction will be issued as an addendum by the Chief Procurement Officer. Only interpretations or correction by addendum shall be binding. No bidder shall rely upon any interpretation or correction given by any other method.

## **7. ADDENDA**

- A. Prior to the receipt of the bids, addenda will be forwarded to each person or firm recorded by the Town as having received the bidding documents and will be available for inspection wherever the bidding documents are kept available for that purpose.
- B. Addenda issued during the time of bidding shall be listed on proposal forms in the space provided. Failure of a bidder to receive any addendum shall not release the bidder from any obligations under their bid, provided said addendum was sent by e-mail, by U.S. mail, or successful facsimile to the address furnished by the bidder for transmittal of mail. Bidders should always confirm final addendum(s) issued before submitting their bid.

## **8. REJECTION OF PROPOSALS**

The bidder acknowledges the right of the Town of Barnstable to reject any or all bids and to waive any informality or irregularity in any bid received. In addition, the bidder recognizes the right of the Town of Barnstable to reject a bid if the bidder fails to furnish any required bid security, or fails to submit the data required by the bidding documents, or if the bid is in any way incomplete or irregular.

**9. QUALIFICATIONS OF BIDDER**

- A. Any bidder, if requested, shall submit a financial statement, experience records, and an equipment schedule, on forms to be provided by the Town of Barnstable. Financial statements shall reflect true financial conditions of bidder within three months prior to date of bid opening and shall be validated by a Certified Public Accountant.
- B. A bidder, in order to be eligible for the contract, must be able to show their financial ability to carry on the work until the project is complete and accepted by the Town of Barnstable.

**10. LABOR AND MATERIALS PAYMENT & PERFORMANCE BONDS**

- A. Within ten (10) days after the date of Notice of Award of Contract, Saturdays, Sundays and legal holidays excluded, the bidder to whom the award is made shall furnish a performance bond and labor and materials bond, each equal to the full amount of the contract price, including accepted alternates (if applicable) to guarantee the faithful performance of all terms, covenants and conditions of the same. The bonds are to be issued by an acceptable bonding company qualified to do business under the laws of the Commonwealth of Massachusetts and satisfactory to the Town of Barnstable.
- B. The performance bond shall guarantee the satisfactory completion of the project and that the contractor will make good any faults or defects in their work which may develop during the period of said guarantee as a result of improper or defective workmanship, material or apparatus. The full performance bond shall remain in effect until final payment is received by the Contractor.

The payment bond shall guarantee that the contractor shall pay in full all persons, firms or corporations who furnish labor or material or both labor and materials for, or on account of the work included herein. Payment bonds will be in effect until such time as the contractor furnishes proof that payment in full has been made for all materials used on the contract work. The bonds shall be paid for by the contractor. The Town of Barnstable shall have the right to demand proof that parties signing the bonds are duly authorized to do so.

- C. Every such bond shall have a power of attorney attached thereto, authorizing the Town of Barnstable to enter judgment thereon in any court in the United States of America or elsewhere against the obligors therein named for the amount therein named and shall be conditioned for the honest and faithful compliance with all provisions of the bidder or bidders.
- D. Separate Performance Bond and Labor and Materials Payment Bond forms shall be provided with Notice of Acceptance.

**11. "OR EQUAL" CLAUSE:** (Statutory reference: M.G.L. Ch.30, §39M(b)) Where products, materials or equipment are prescribed by manufacturer name, trade name, or catalog reference, the word "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 Consulting Engineer :

- a. it is at least equal in quality, durability, appearance, strength and design;

- b. it performs at least equally the function imposed for the public work being contracted for or the material being purchased; 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 substituted Equipment under this paragraph shall be at the expense of the Contractor or Subcontractor responsible for the work item. See other paragraphs of the General Conditions for any procedures that may be used in determining compliance with the standards of this paragraph.

## 12. SUBSTITUTIONS

- A. The Bid shall be based on using the materials or products as specified and provided. Where several materials are specified by name for one use, any of those so specified may be supplied.
- B. Whenever the specified products or class of materials is specified exclusively by trade name, by manufacturer's name or by catalog reference, only such items shall be used, unless the Town's written approval for substitution is secured in accordance with the Conditions of the Contract.

## 13. WORK TIME LIMITS

- A. Contractor shall furnish a proposed construction schedule, in writing, with their bid. A final construction schedule shall be submitted at the time of delivery of the properly executed contract, bonds and certificates of insurance to the Awarding Authority, allowing for completion of the contract work prior to the date specified below and appearing on the Contract Form. Thereupon the Town of Barnstable will review the completed documents and proposed schedule, ask for revisions or corrections, or issue a "NOTICE TO PROCEED" indicating its agreement with final contract terms.
- B. The completion date for all of the work to be performed under this contract is **May 1, 2018. The actual construction may begin not earlier than on September 5, 2017, and the tank must remain in service until September 15, 2017, and be back in service by November 15<sup>th</sup>, 2017.**

## 14. TAX EXEMPTION

The project is exempt from payment of Massachusetts sales tax to the extent permitted by MGL Ch. 64H, Subsection 6F. **Exemption Certificate E-046-001-079** shall be used in lieu thereof.

## 15. ACCEPTANCE OF PROPOSALS

Within thirty (30) days after the opening of the proposals the Town of Barnstable will act upon them. The acceptance of a proposal will be a Notice of Acceptance in writing signed by a duly authorized representative of the Town of Barnstable and accompanied by Performance and Labor and Materials Payment Bond forms. No other act of the Town of Barnstable shall constitute the acceptance of a proposal. The acceptance of the proposal shall bind the successful bidder to the contract. The rights and obligations provided for in the contract shall become effective and binding upon the parties only upon its formal execution.

**16. TIME FOR EXECUTING CONTRACT AND PROVIDED CONTRACT BONDS**

Any contractor whose proposal shall be accepted will be required to execute the contract and furnish contract bonds within ten (10) days, Saturdays, Sundays and legal holidays excluded after the notice that the contract has been awarded to them.

**17. PAYMENT OF EMPLOYEES**

- A. For work done in the Town of Barnstable, the payment for employees of the Contractor and any or all Sub-contractors and suppliers shall comply with the wage scale current at the commencement of construction, as published by the Department of Labor and Industries, under provisions of the Massachusetts General Laws. The Contractor and each of his Sub-contractors and suppliers shall pay each of their employees engaged in work on the project under the contract in full, less deductions made mandatory by law, and not less often than once a week. All forms required by local authorities, the Commonwealth of Massachusetts, and the United States Government, shall be properly submitted. No payments will be made on any application for payment until all required payroll and Affirmative Action/Equal Opportunity information for the period covered by the application has been submitted to the Town.
- B. A copy of applicable wage rate schedules is attached and forms part of the contract documents.

**18. WITHDRAWAL OF PROPOSALS**

- A. At any time prior to the scheduled closing time for receipt of proposals, any bidder may withdraw his proposal, either personally or by email or written request. If withdrawal is made personally, proper receipt shall be given therefore.
- B. After the scheduled time for receipt of proposals and before award of contract, no bidder will be permitted to withdraw his proposal unless said award is delayed for a period exceeding thirty (30) days. Negligence on the part of the bidder in preparing his bid confers no rights for the withdrawal of the proposal after it has been opened.

**19. ENGINEER, OWNER, AND OWNER'S REPRESENTATIVE**

- A. The Engineer, Owner, and Owner's appointed Representative shall maintain the same authority and responsibility for the project. Each said entity shall represent and act in place of Engineer, Owner, and Owner's Representative in their absence.

END OF SECTION

SECTION 00300

BID FORM

**The following must be filled out in their entirety by the General Bidder and, except for as noted, submitted with the bid.**

- Proposal Form. Pages 00300-2 & 3
  - Acknowledge ALL addenda Page 00300-2
  - Fill in Contract Price Page 00300-2
  - Unit Bid Price Table – Base Bid Page 00300-4
  - Alternate Bid Price Table - Alternate No. 1 Page 00300-6
  - Signed by Authorized Representative Page 00300-6
  - State Taxes Certification Clause Page 00300-7
  - Certificate of Non-Collusion Page 00300-7
  - OSHA Training Certification of Contractor Pages 00300-8 & 9
  - 5% Bid Bond
  - Water Tank Painting Qualifications

**PROPOSAL FORM**

\_\_\_\_\_  
CONTRACTOR

TO: Town of Barnstable , Chief Procurement Officer  
230 Main Street  
Hyannis, MA 02601

A. The undersigned proposes to furnish all labor and materials required for the construction of:

**“REHABILITATION OF THE MARY DUNN No. 1 WATER STORAGE TANK  
AND TANK SITE IMPROVEMENTS”  
CONTRACT NO. 16-17-03**

In accordance with the Plans and Specifications prepared by Tata & Howard Inc., for the estimated contract price specified below subject to additions and deductions according to the terms of the Contract Documents.

B. This bid includes Addenda Numbered \_\_\_\_\_ to \_\_\_\_\_, inclusive

C. Total Amount of Base Bid is: \$ \_\_\_\_\_ . \_\_\_\_\_  
(figures)

\_\_\_\_\_  
(words)

Total Amount of Alternate 1 is: \$ \_\_\_\_\_ . \_\_\_\_\_  
(figures)

\_\_\_\_\_  
(words)

See Item F. for details on Contract Award.

D. The undersigned, as bidder, declares under penalties of perjury that the only persons or parties interested in this proposal as principals are those named herein; that this proposal is made and submitted in good faith and without collusion or fraud with any other person, firm or corporation; that he has filed all state tax returns and paid all state taxes under law; that he has carefully examined the locations of the proposed work, the proposed form of contract, the standard specifications and plans therein referred to and the Special Conditions herein annexed; and he proposes and agrees, if this proposal is accepted, that he will contract with the Awarding Authority, in the form of the contract referred to herein and to be annexed hereto, to provide all necessary machinery, tools, apparatus and other means of construction and to do all the work and

furnish all the materials specified in the contract, in the manner and time herein prescribed, and according to the requirements of the Engineer as therein set forth, and that he will take in full payment therefore the following unit prices, per pages 00300-4 to 00300-6.

- E. The undersigned agrees that if presented with the Notice of Acceptance for this contract, he will within ten (10) days, Saturdays, Sundays and legal holidays excluded, execute a contract in accordance with the terms of this bid and furnish a performance bond and a 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 one hundred (100%) percent of the contract price, the premiums for which are to be paid by the Contractor and are included in the contract price.
- F. Should the Awarding Authority choose to include Alternate 1 in the award of the Contract, Bid Item No. 15 in the Base Bid will be deleted and replaced with all Bid Items included under Alternate 1, and the responsible Contractor with the lowest Base Bid with alternate price shall be award the Contract, subject to review of Contractor qualifications.
- G. See Specification Section 01100 Instruction to Bidders for construction dates, and Specification Section 00500 Agreement for Contract Terms. Bidder further agrees to pay as liquidated damages, the sum of \$1,300 for each consecutive calendar day thereafter.
- H. N/A
- I. The time period for holding bids is 30 days, Saturdays, Sundays and legal holidays excluded, after the opening of bids.
- J. Pursuant to M.G.L.c.62C, s49A I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all State Taxes required under law.



### UNIT BASE BID PRICE TABLE

ITEM NUMBER	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		TOTAL AMOUNT	
			DOLLARS	CENTS	DOLLARS	CENTS
1) Demolish existing roof, support structures, and center rigging post assembly	1 LS	<hr/> Dollars ( ) per LS				
2) Furnish and install new factory coated, FAA compliant, aluminum geodesic dome roof including finial vent, 2 access hatches, safety handrails, and roof ladder, and power tool cleaning and spot coat repairs	1 LS	<hr/> Dollars ( ) per LS				
3) Rivet Repair	20 EA	<hr/> Dollars ( ) per EA				
4) Steel Overlap Seam Repair	100 LF	<hr/> Dollars ( ) per LF				
5) Foundation reconditioning • Power tool clean and spot coat repairs of foundation anchor bolts and stools	1 LS	<hr/> Dollars ( ) per LS				
6) Miscellaneous Rehabilitation: • Overflow System Outlet Modification • Remove existing ladder and cage, install new access ladder, safety cage, ladder security gate, and safety climb device • Roof ladder fall arrest cable system	1 LS	<hr/> Dollars ( ) per LS				
7) Furnish and install new 8' high chain link fence with barbed wire • Relocate existing fence where noted on plans • Install barbed wire on existing fence where noted on plans	400 LF	<hr/> Dollars ( ) per LF				

ITEM NUMBER	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		TOTAL AMOUNT	
			DOLLARS	CENTS	DOLLARS	CENTS
8) Fence Gates • Double Gate • Relocate existing pedestrian gate and install mount for FOB Reader	1 LS	_____ Dollars ( _____ ) per LS				
9) Furnish and install new 5' high chain link fence	200 LF	_____ Dollars ( _____ ) per LF				
10) Electric Barrier Gate and mounts for FOB Readers	1 LS	_____ Dollars ( _____ ) per LS				
11) SCADA Antenna Improvements	1 LS	_____ Dollars ( _____ ) per LS				
12) Electrical Work	1 LS	_____ Dollars ( _____ ) per LS				
13) Clearing and Grubbing	1 LS	_____ Dollars ( _____ ) per LS				
14) Processed Gravel Subbase	225 CY	_____ Dollars ( _____ ) per CY				
15) Gravel Access Road	110 CY	_____ Dollars ( _____ ) per CY				
16) Gravel Drive Turning Area	40 CY	_____ Dollars ( _____ ) per CY				
17) Timber Guardrail, Rip Rap, and Appurtenances	1 LS	_____ Dollars ( _____ ) per LS				
18) Loam and Seed	1,000 SY	_____ Dollars ( _____ ) per SY				
19) Crushed Stone Ground Cover	300 CY	_____ Dollars ( _____ ) per CY				
20) FOB Readers equipment and integration	Stated Allowance	_____ Stated Allowance in Words	\$30,000	00	\$30,000	00
21) SCADA Integration	Stated Allowance	_____ Stated Allowance in Words	\$2,500	00	\$2,500	00

**Total Amount of Base Bid Items 1 through 21 is:**      \$ \_\_\_\_\_ . \_\_\_\_\_  
(figures)

**ALTERNATE 1 BID PRICE TABLE**

ITEM NUMBER	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		TOTAL AMOUNT	
			DOLLARS	CENTS	DOLLARS	CENTS
1A. Pave access road	940 SY	_____ Dollars ( _____ ) per SY				
2A. Deduct Line Item No. 15 from the Base Bid	110 CY	_____ Dollars ( _____ ) per CY				

**Total Amount of Alternate 1 Items 1A through 2A is:**

\$ \_\_\_\_\_ . \_\_\_\_\_  
(figures)

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

\_\_\_\_\_  
Authorized Signature

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

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

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Telephone

\_\_\_\_\_  
Email

**STATE TAXES CERTIFICATION CLAUSE**

I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all State Tax returns and paid all State Taxes under law.

\_\_\_\_\_ By: \_\_\_\_\_  
\* Signature of Individual or Corporate Officer  
Corporate Name (Mandatory) (Mandatory, if applicable)

\_\_\_\_\_  
\*\*Social Security No. (Voluntary)  
or Federal Identification No.

\* Approval of a contract or other agreement will not be granted unless this certification clause, if signed,

\*\*Your Social Security Number will be furnished to the Massachusetts Department of Revenue to determine whether you have met tax filing or tax payment obligations. Providers who fail to correct their non-filing or delinquency **will not have a contract or agreement issued, reviewed, or extended.** This request is made under the authority of Mass. G.L. 62C, S.49A.

\*\*\*\*\*

**TOWN OF BARNSTABLE**

**CERTIFICATE OF NON COLLUSION**

The undersigned certifies under penalties of perjury that this bid or 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.

FIRM \_\_\_\_\_ SIGNATURE \_\_\_\_\_

ADDRESS \_\_\_\_\_ NAME (print) \_\_\_\_\_

\_\_\_\_\_ TITLE \_\_\_\_\_

TELEPHONE \_\_\_\_\_ DATE \_\_\_\_\_

**NOTE: This certificate must be signed by the individual submitting the bid or proposal.**

## **Town of Barnstable Procedures**

### **OSHA Training Certification of Contractors**

As of July 1, 2011, the Town of Barnstable will comply with the amended MGL chapter 30 section 39s **“Contracts for Construction: Requirements”** as follows.

The Town of Barnstable in all bids and contracts that fall under the application of this law, as amended, will require bidders and/or contractors to comply with the requirements of certifying that they and their employees have complied with MGL chapter 30 section 39s. This law requires successful completion of a 10 hour OSHA safety training course prior to working on the Town’s worksite or in the work subject to the bid or contract.

The Town will reject any bids that do not include proper certification submitted with the bids at the posted time for bid opening, however, the town may, at its sole discretion, allow up to two (2) working days for the contractor to submit the required certification. In those cases where contracts are offered without using the sealed bid process, the same certification will be due upon contract signing.

It is expected that the contractor, by signing the certification form provided with the bid is fully meeting the language of the law, as amended, and that they are accepting the responsibilities to comply with the law for the full term of the work.

The Town of Barnstable will pay certified payrolls that are deemed complete. The statute indicates that with the first certified payroll submitted to the Town, documentation must be provided that each employee on the payroll documents submitted to the Town has successfully completed the OSHA training.

Any employee whose name does not appear on the first certified payroll must submit certification with the first payroll they do appear on. Failure to provide full documentation may result in a delay in payment to the vendor as the packet submitted for payment would be determined to be incomplete.

Any employee found on a worksite subject to this section without documentation of successful completion of 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 shall be subject to immediate removal.

This certification requirement will go into effect for any bids received or contracts awarded after July 1, 2011 in accordance with MGL 30 39s as amended by Chapter 306 of the Acts of 2004.

**CERTIFICATION  
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) TRAINING**

In accordance with Massachusetts General Law 30: Section 39S, as amended by Chapter 306 of the Acts of 2004, effective 7/1/06, for all contracts for the construction, reconstruction, alteration, remodeling or repair of any public work or the construction, reconstruction, installation, demolition, maintenance or repair of any public building estimated to cost more than \$10,000, the Contractor hereby certifies to the following:

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

(b) Any employee found on a worksite subject to this section without documentation of successful completion of 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 shall be subject to immediate removal.

(c) The attorney general, or his designee, shall have the power to enforce this section including the power to institute and prosecute proceedings in the superior court to restrain the award of contracts and the performance of contracts in all cases where, after investigation of the facts, he has made a finding that the award or performance has resulted in violation, directly or indirectly, of subsection (b), and he shall not be required to pay to the clerk of the court an entry fee in connection with the institution of the proceeding.

The undersigned hereby certifies under the penalties of perjury to the above:

**Company:** \_\_\_\_\_

**Authorized Signature:** \_\_\_\_\_

**Print Name:** \_\_\_\_\_

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

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

Telephone \_\_\_\_\_ Fax: \_\_\_\_\_

P:\PROJECTS\Cook Cir\Div 0\00300 - Bid Form.DOC

## WATER TANK PAINTING QUALIFICATIONS

The following information is required by all bidders and must be presented with each proposal. The bidder is to complete all information associated with five (5) projects of similar nature to the project specified herein.

PLEASE LIST WATER TANK PROJECTS ONLY.

1.      Water Storage Tank Location: \_\_\_\_\_  
          Water Storage Tank Size:           \_\_\_\_\_

          Water Superintendent's Name: \_\_\_\_\_  
          Address: \_\_\_\_\_  
          Telephone: \_\_\_\_\_  
          Description of Work Completed by Bidder: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Project Cost: \_\_\_\_\_  
Date of Work: \_\_\_\_\_

2.      Water Storage Tank Location: \_\_\_\_\_  
          Water Storage Tank Size:           \_\_\_\_\_

          Water Superintendent's Name: \_\_\_\_\_  
          Address: \_\_\_\_\_  
          Telephone: \_\_\_\_\_  
          Description of Work Completed by Bidder: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Project Cost: \_\_\_\_\_  
Date of Work: \_\_\_\_\_

3. Water Storage Tank Location: \_\_\_\_\_  
Water Storage Tank Size: \_\_\_\_\_  
Water Superintendent's Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Description of Work Completed by Bidder: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Cost: \_\_\_\_\_  
Date of Work: \_\_\_\_\_

4. Water Storage Tank Location: \_\_\_\_\_  
Water Storage Tank Size: \_\_\_\_\_  
Water Superintendent's Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Description of Work Completed by Bidder: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Cost: \_\_\_\_\_  
Date of Work: \_\_\_\_\_



5. Water Storage Tank Location: \_\_\_\_\_  
Water Storage Tank Size: \_\_\_\_\_  
Water Superintendent's Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Description of Work Completed by Bidder: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Cost: \_\_\_\_\_  
Date of Work: \_\_\_\_\_

END OF BID FORM

SECTION 00500

AGREEMENT

THIS AGREEMENT, made this \_\_\_\_\_ day of \_\_\_\_\_ 2017 by and between the TOWN OF BARNSTABLE, Massachusetts, hereinafter called Owner, and \_\_\_\_\_

\_\_\_\_\_ with legal address and principal place of business at \_\_\_\_\_

\_\_\_\_\_ hereinafter called Contractor:

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the **REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK AND TANK SITE IMPROVEMENTS** hereinafter called the Project, for the consideration set forth in the Proposal and all extra work in connection therewith, under the terms as stated in the General and Supplemental General Conditions of the Contract; and at their own cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintending, labor, insurance, and other accessories and services necessary to complete said Project in accordance with the conditions and prices stated in the Proposal, the General Conditions, the Supplemental and Special Conditions of the Contract, any addenda previously issued, and all other documents included in the bound volume entitled **“INVITATION FOR BID AND CONTRACT FOR REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK AND TANK SITE IMPROVEMENTS” IN THE TOWN OF BARNSTABLE, MASSACHUSETTS, CONTRACT NO. 16-17-03 DATED \_\_\_\_\_**” and the bid submitted \_\_\_\_\_, all of which are made a part hereof and collectively evidence and constitute the Contract.

Force Majeure. The Agreement shall be subject to Force Majeure considerations. Either party hereto shall be excused from performance of any act under the contract if prevented for the performance of any act required by reasons of strikes, lockouts, labor trouble, inability to procure materials, failure of power, fire, winds, Acts of God, riots, insurrections, war or other reason of a like nature not reasonably within the control of the party. The period for the performance of such obligation shall be extended for an equivalent period for no additional cost to the owner. In the event that the extension is not possible, the Contractor may be required to rebate to the Town a portion of the fee. Continued failure to perform for periods aggregating sixty (60) or more days, even for causes beyond the control of the Contractor, shall be deemed to render performance impossible, and the Owner shall thereafter have the right to terminate this agreement in accordance with the provisions of the section entitled “Termination of Contract”.

Termination of Contract - Subject to the provisions of the section explaining Force Majeure, if the Contractor shall fail to fulfill in a timely and satisfactory manner its obligations under this agreement, or if the Contractor shall violate any of the covenants, conditions, or stipulations of this agreement, which failure or violation shall continue for seven (7) business days after written notice of such failure or violation is received by the contractor, then the municipality shall thereupon have the right to terminate this agreement by giving written notice to the contractor of such termination and specifying the effective date thereof, at least seven (7) days before the effective date of such termination.

Insurance - The Contractor shall maintain insurance with minimum limits as defined in the Invitation for Bid, Section 3.11 for the entire duration of the project work to be performed, and provide a certificate of insurance with the Town of Barnstable named as an additional insured. Renewal certificates of insurance must be submitted to the Town of Barnstable, Risk Management, and 230 South St., Hyannis, MA 02601 on a yearly basis.

Governing Law – This contract is governed by the laws of the Commonwealth of Massachusetts.

Massachusetts General Law Chapter 149 and 30 S.39M hereby apply to this contract. Prevailing wages dated May 8, 2017 apply to this contract. The contractor shall submit weekly certified payrolls with invoices to Town of Barnstable, Attn: Dale Saad, 382 Falmouth Road, Hyannis, MA 02601. OSHA 10 certification is required for all employees and subcontractors performing work on the job site. A one hundred percent (100%) payment bond and performance bond is required with this signed contract.

The Contractor shall indemnify, defend, and save harmless the TOWN, all of the TOWN officers, agents and employees from and against all suits and claims of liability of every name and nature, including attorney's fees and costs of defending any action or claim, for or on account of any claim, loss, liability or injuries to persons or damage to property of the TOWN or any person, firm, corporation or association arising out of or resulting from any act, omission, or negligence of the Contractor, subcontractors and their agents or employees in the performance of the work covered by this Agreement and/or their failure to comply with terms and conditions of this Agreement. The foregoing provisions shall not be deemed to be released, waived or modified in any respect by reason of any surety or insurance provided by the Contractor under contract with the TOWN.

THE OWNER agrees to pay the Contractor for the performance of the Contract, subject to additions and deductions, as provided in the General Conditions of the Contract, and to make payments on account thereof as provided in Sub-Section 9 of Section 3, General Conditions.

CONTRACT AMOUNT \$ \_\_\_\_\_  
The total payment shall not exceed this contract amount, without the written authorization of the Owner.

Contractor and Owner recognize that time is of the essence and that Owner will suffer financial loss if the Work is not completed within the times specified in the Agreement, plus any extensions thereof allowed in accordance the General Conditions and this contract. 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 \$1,300 for each day that expires after the time specified in the Agreement 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 \$1,300 for each day that expires after the time specified in the Agreement for completion and readiness for final payment until the Work is completed and ready for final payment.

**The completion date of this project is May 1, 2018.**

**Liquidated damages specified in this contract are \$1,300 per day for each calendar day beyond the contract completion date that work remains uncompleted.**

*The Direct Labor mark-up (percentage) for change orders on this project shall be \_\_\_\_\_%.*

This Agreement constitutes the entire contract and there are no agreements other than those incorporated herein. This Agreement may not be changed, altered, amended, modified, or terminated orally and any such change, alteration, amendment, or modification must be in writing and executed by the parties hereto.

IN WITNESS WHEREOF, the parties to these presents have executed this Contract in the year and day first above mentioned.

By:

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Print Name and Title

Approved as to form

\_\_\_\_\_  
Ruth J. Weil, Esq., Town Attorney

By:

\_\_\_\_\_  
Mark S. Ells, Town Manager

I hereby certify that the Town of Barnstable has an appropriation to cover the cost of this contract in accordance with Ch 44 §31C of the Massachusetts General Laws

By:

\_\_\_\_\_  
Mark A. Milne, Finance Director

The Certificate shall be signed by the auditor or accountant or other officer having similar duties of the Town of Barnstable, Massachusetts and the official title noted below the signature.

SIGNATORY AUTHORITY – Project Name: **REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK AND TANK SITE IMPROVEMENTS, PROJECT 16-17-01**

At a duly constituted meeting of \_\_\_\_\_ held on \_\_\_\_\_  
Name of (Corporation) (Date)

at which all Directors were present or waived notice, it was voted that:

\_\_\_\_\_  
(Name) (Officer)  
of this company, be and he/she is hereby authorized to execute contracts and bonds in the name and 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 of such \_\_\_\_\_ under seal of the company, shall  
(Officer)  
be valid and binding upon this company.

A TRUE COPY,  
ATTEST:

\_\_\_\_\_  
(Clerk)

Place of Business: \_\_\_\_\_

\_\_\_\_\_

Date of this Contract: \_\_\_\_\_

I hereby certify that I am the clerk of the \_\_\_\_\_  
\_\_\_\_\_ that \_\_\_\_\_  
is duly elected \_\_\_\_\_ of said company, and the above  
vote has not been amended or rescinded and remains in full force and effect as  
of the date of this contract

\_\_\_\_\_  
(Clerk)

(CORPORATE SEAL)

On this \_\_\_\_\_ day of \_\_\_\_\_, 2017, before me, the undersigned notary public, personally appeared \_\_\_\_\_, proved to me through satisfactory evidence of identification, which were \_\_\_\_\_, to be the person whose name is signed on the preceding or attached document in my presence.

\_\_\_\_\_  
Notary Public  
My commission expires:

IF A CORPORATION, COMPLETE ABOVE OR ATTACH TO EACH SIGNED COPY OF THE CONTRACT A NOTARIZED COPY OF VOTE OF CORPORATION AUTHORIZING THE SIGNATORY TO SIGN THIS CONTRACT. IF ATTESTING CLERK IS THE SAME PERSON AS THE INDIVIDUAL EXECUTING THIS CONTRACT, HAVE SIGNATURE NOTARIZED ABOVE.

END OF SECTION

Rehabilitation of the Mary  
Dunn No. 1 Water Storage Tank  
and Tank Site Improvements

AGREEMENT  
00500-5

Barnstable, Massachusetts  
Contract No. 16-17-03

SECTION 00551

NOTICE TO PROCEED

DATE: \_\_\_\_\_, 2017

**SUBJECT: REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK  
AND TANK SITE IMPROVEMENTS  
Contract Number 16-17-03**

TO:

1. You are hereby given formal NOTICE TO PROCEED in accordance with the provisions of the subject contract.
2. It is requested that acknowledgment of this NOTICE be indicated by endorsement hereon, and that the original be returned to this office. The duplicate should be retained in your office files.

\_\_\_\_\_  
Paul Graves, P.E., Town Engineer

**FIRST ENDORSEMENT**

TO: Town Engineer  
382 Falmouth Road  
Hyannis, MA 02601

Receipt is hereby acknowledged of the above **NOTICE TO PROCEED**

under contract # 16-17-03

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

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

END OF SECTION

SECTION 00610

PAYMENT BOND

KNOWN ALL MEN AND WOMEN BY THESE PRESENTS, THAT \_\_\_\_\_

\_\_\_\_\_
as principal, and \_\_\_\_\_
as surety, are held and firmly bound unto the Town of Barnstable, Massachusetts in the sum of:

\_\_\_\_\_
lawful money of the United State of America, to be paid to the Town of Barnstable, Massachusetts, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said principal has made a contract with the Town of Barnstable, Massachusetts, bearing the date of \_\_\_\_\_, 2017, for the construction project

REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK AND TANK SITE IMPROVEMENTS

Now the condition of this obligation is such that if the principal shall pay for all labor performed or furnished and for all materials used or employed in said contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any other purpose or items set out in, and subject to, the provisions of Massachusetts General Laws, Chapter 30, Section 39A, and Chapter 149, Section 29, as amended, then this obligation shall become null and void; otherwise it shall remain in full force and virtue.

IN WITNESS THEREOF, we hereunto set our hands and seals this \_\_\_\_\_

day of \_\_\_\_\_, 2017.

(Seal)

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

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

END OF SECTION



SECTION 00620

PERFORMANCE BOND

KNOW ALL MEN AND WOMEN BY THESE PRESENTS, THAT

\_\_\_\_\_ as principal,

and \_\_\_\_\_

as surety, are held and firmly bound unto the Town of Barnstable,

Massachusetts, in the sum of \_\_\_\_\_

lawful money of the United States of America, to be paid to the Town of Barnstable, Massachusetts, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said principal has made a contract with the Town of Barnstable, Massachusetts, bearing the date of \_\_\_\_\_, 2017, for the construction of

**REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK AND TANK SITE IMPROVEMENTS, PROJECT 16-17-03**

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

IN WITNESS WHEREOF we hereunto set our hands and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

Seal

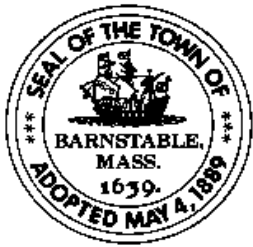
\_\_\_\_\_

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

\_\_\_\_\_

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

END OF SECTION



**Town of Barnstable**  
**Department of Public Works**  
http://www.town.barnstable.ma.us



WATER SUPPLY DIVISION  
47 Old Yarmouth Road  
Hyannis, MA 02601  
Tel: 508-778-9617  
Fax: 508-790-1313

Michael Gorenstein, P.E.  
*Project Manager*  
Tel: 508-775-0063  
Cell: 508-328-5295

**CHANGE ORDER**

CHANGE ORDER NO. \_\_\_\_\_ DATE: \_\_\_\_\_

CONTRACT NO. 16-17-03 SRF NO: N/A

CONTRACT TITLE: REHABILITATION OF THE MARY DUNN NO. 1 WATER STORAGE TANK AND TANK SITE IMPROVEMENTS

CONTRACTOR'S NAME: \_\_\_\_\_

CONTRACTOR'S ADDRESS: \_\_\_\_\_

CONTRACT AMOUNT AS BID	\$ _____
PREVIOUS CONTRACT AMOUNT	\$ _____
AMOUNT OF THIS ORDER (increase)	\$ _____
TOTAL REVISED CONTRACT AMOUNT	\$ _____

This change order extends the time to complete the work by \_\_\_\_\_ days.

The adjusted completion date of contract is \_\_\_\_\_.

This order covers the contract modification hereunder described:

The additional work caused by water main break due to unknown location of the existing water main.

Rehabilitation of the Mary  
Dunn No. 1 Water Storage Tank  
and Tank Site Improvements

CHANGE ORDER  
00650-1

Barnstable, Massachusetts  
Contract No. 16-17-03

The work covered by this order shall be performed under the same terms and conditions as included on the original construction contract.

**Change Submitted:**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Contractor: Signature, Name and Title

**Change Approved:**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Daniel W. Santos, P.E., Director, DPW

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Mark Milne, Finance Director  
Verify funds are available for this change order

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Ruth Weil, Town Attorney

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Mark. S. Ells, Town Manager

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

## STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



Issued and Published Jointly by



These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
  3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  5. *Bidder*—An individual or entity that submits a Bid to Owner.
  6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
  7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
  8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
  9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

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

## 1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:*
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - a. does not conform to the Contract Documents; or
    - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
    - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. *Furnish, Install, Perform, Provide:*
1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **ARTICLE 2 – PRELIMINARY MATTERS**

### **2.01 *Delivery of Bonds and Evidence of Insurance***

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

### **2.02 *Copies of Documents***

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

### **2.03 *Before Starting Construction***

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
  1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
  2. a preliminary Schedule of Submittals; and



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

#### 2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

#### 2.05 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
  1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
  3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

#### 2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

### **ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

#### **3.01 *Intent***

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

#### **3.02 *Reference Standards***

- A. Standards Specifications, Codes, Laws and Regulations
  - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  - 2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

#### **3.03 *Reporting and Resolving Discrepancies***

- A. *Reporting Discrepancies:*
  - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
  - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

### 3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
  - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
  - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

## **ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK**

### 4.01 *Commencement of Contract Times; Notice to Proceed*

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

### 4.02 *Starting the Work*

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

### 4.03 *Reference Points*

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

### 4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
  - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

#### 4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  2. abnormal weather conditions;
  3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
  4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

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

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

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

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

- 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
- 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

### 5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
  - 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
  - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
  - 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
  - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
  - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

#### 5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
  2. is of such a nature as to require a change in the Drawings or Specifications; or
  3. differs materially from that shown or indicated in the Contract Documents; or
  4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
    - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,



- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
  - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
  - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
  - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

#### 5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
  1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
    - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
    - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
    - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

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

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
  - 1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
    - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
    - d. Contractor gave the notice required in Paragraph 5.05.B.
  - 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  - 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings*: The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
  2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 6 – BONDS AND INSURANCE

### 6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

### 6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

### 6.03 *Contractor's Insurance*

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
  - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
  - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
  2. claims for damages insured by reasonably available personal injury liability coverage.
  3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage:
    - a. Such insurance shall be maintained for three years after final payment.
    - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
  2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
  3. Broad form property damage coverage.
  4. Severability of interest.
  5. Underground, explosion, and collapse coverage.
  6. Personal injury coverage.
  7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
  8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
  - 1. include at least the specific coverages provided in this Article.
  - 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
  - 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
  - 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
  - 5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.



#### 6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

#### 6.05 *Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
  - 1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
  - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
  - 3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
  - 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
  6. extend to cover damage or loss to insured property while in transit.
  7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
  8. allow for the waiver of the insurer's subrogation rights, as set forth below.
  9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
  10. not include a co-insurance clause.
  11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
  12. include performance/hot testing and start-up.
  13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

## 6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
  - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
  - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

## 6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

## **ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES**

### **7.01 *Supervision and Superintendence***

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

### **7.02 *Labor; Working Hours***

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

### **7.03 *Services, Materials, and Equipment***

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

#### 7.04 "Or Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
      - 3) it has a proven record of performance and availability of responsive service; and
      - 4) it is not objectionable to Owner.
    - b. Contractor certifies that, if approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
      - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

#### 7.05 *Substitutes*

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
  - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
  - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
  - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
    - a. shall certify that the proposed substitute item will:
      - 1) perform adequately the functions and achieve the results called for by the general design,
      - 2) be similar in substance to that specified, and
      - 3) be suited to the same use as that specified.
    - b. will state:
      - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
      - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
      - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
    - c. will identify:
      - 1) all variations of the proposed substitute item from that specified, and

- 2) available engineering, sales, maintenance, repair, and replacement services.
- d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

#### 7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.



O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

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

7.08 *Permits*

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

#### 7.09 *Taxes*

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

#### 7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

#### 7.11 *Record Documents*

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

#### 7.12 *Safety and Protection*

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

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
  - C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
  - D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
  - E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
  - F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
  - G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

#### 7.13 *Safety Representative*

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

#### 7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 7.15 *Emergencies*

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

#### 7.16 *Shop Drawings, Samples, and Other Submittals*

##### A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
  - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
  - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

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

##### 1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples:*
    - a. Contractor shall submit the number of Samples required in the Specifications.
    - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
  3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. *Engineer's Review:*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
  2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
  3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
  4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
  5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
  6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
  7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

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

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  1. observations by Engineer;
  2. recommendation by Engineer or payment by Owner of any progress or final payment;
  3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
  4. use or occupancy of the Work or any part thereof by Owner;
  5. any review and approval of a Shop Drawing or Sample submittal;
  6. the issuance of a notice of acceptability by Engineer;
  7. any inspection, test, or approval by others; or
  8. any correction of defective Work by Owner.

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

#### 7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
  - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

#### 7.19 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

## **ARTICLE 8 – OTHER WORK AT THE SITE**

### **8.01 *Other Work***

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.



## 8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
  - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
  - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
  - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

## 8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

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

## **ARTICLE 9 – OWNER'S RESPONSIBILITIES**

### **9.01 *Communications to Contractor***

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

### **9.02 *Replacement of Engineer***

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

### **9.03 *Furnish Data***

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

### **9.04 *Pay When Due***

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

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

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### **9.06 *Insurance***

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

### **9.07 *Change Orders***

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

**ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION**

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

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

10.04 *Rejecting Defective Work*

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

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

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

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

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

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

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

#### 10.09 *Compliance with Safety Program*

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

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

#### 11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
  - 1. *Change Orders:*
    - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
    - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
  - 2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

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

#### 11.02 *Owner-Authorized Changes in the Work*

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

#### 11.03 *Unauthorized Changes in the Work*

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

#### 11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
  1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
    - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

#### 11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

#### 11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
  2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
  3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

#### 11.07 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
  2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
  3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
  4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.



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

#### 11.08 *Notification to Surety*

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

### **ARTICLE 12 – CLAIMS**

#### 12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
  - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
  - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
  - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
  - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

### 13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
  1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
  2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
  1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

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

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

## 13.02 Allowances

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

- B. *Cash Allowances*: Contractor agrees that:
  - 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
  - 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

### 13.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
  - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
  - 2. there is no corresponding adjustment with respect to any other item of Work; and
  - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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

### **14.01 Access to Work**

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

### **14.02 Tests, Inspections, and Approvals**

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
  - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  - 3. by manufacturers of equipment furnished under the Contract Documents;
  - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
  - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

#### 14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

#### 14.04 *Acceptance of Defective Work*

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

#### 14.05 *Uncovering Work*

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

- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
  - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
  - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

#### 14.06 *Owner May Stop the Work*

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

#### 14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will



include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

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

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

### **15.01 Progress Payments**

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
  2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
  3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.
- C. *Review of Applications:*
1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
  2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
    - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
    - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
  4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
    - a. to supervise, direct, or control the Work, or
    - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
    - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
    - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
    - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
  5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
  6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
    - a. the Work is defective, requiring correction or replacement;
    - b. the Contract Price has been reduced by Change Orders;
    - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
    - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

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

D. *Payment Becomes Due:*

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

E. *Reductions in Payment by Owner:*

- 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
  - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
  - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
  - c. Contractor has failed to provide and maintain required bonds or insurance;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
  - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
  - f. the Work is defective, requiring correction or replacement;
  - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - h. the Contract Price has been reduced by Change Orders;
  - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
  - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
  - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - l. there are other items entitling Owner to a set off against the amount recommended.
- 2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

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

#### 15.02 *Contractor's Warranty of Title*

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

#### 15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

#### 15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
  - 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
  - 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
  - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
  - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

#### 15.05 *Final Inspection*

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

#### 15.06 *Final Payment*

- A. *Application for Payment:*
  - 1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents;
  - b. consent of the surety, if any, to final payment;
  - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
  - d. a list of all disputes that Contractor believes are unsettled; and
  - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

**B. *Engineer's Review of Application and Acceptance:***

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

**C. *Completion of Work:*** The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

**D. *Payment Becomes Due:*** Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

#### 15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

#### 15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. correct the defective repairs to the Site or such other adjacent areas;
  - 2. correct such defective Work;
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

## **ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION**

### **16.01 *Owner May Suspend Work***

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

### **16.02 *Owner May Terminate for Cause***

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
  - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
  - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
  - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
  - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
  - 1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
  - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,



and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

#### 16.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
  - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
  - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

#### 16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

## **ARTICLE 17 – FINAL RESOLUTION OF DISPUTES**

### **17.01 *Methods and Procedures***

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this Article:
  - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
  - 2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this Article, Owner or Contractor may:
  - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
  - 2. agree with the other party to submit the dispute to another dispute resolution process; or
  - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

## **ARTICLE 18 – MISCELLANEOUS**

### **18.01 *Giving Notice***

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
  - 1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
  - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

### **18.02 *Computation of Times***

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

### **18.03 *Cumulative Remedies***

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS

SECTION 00800

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SECTION 00800  
SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2013 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof, and are gender inclusive.

ARTICLE 1 DEFINITIONS AND TERMINOLOGY

SC-1.01.A.38

Delete paragraph A.38 of the General Conditions in its entirety and insert the following in its place:

“38. Specifications--Sections included under Division 1 thru Division 16 of the Project Manual.”

SC-1.01.A.40

Insert the following at the beginning of the definition:

“40. The Work required by the Contract has been completed except for work having a Contract Price of less than one (1) percent of the then adjusted total Contract Price, or”

SC-1.02.F

Add the following paragraph immediately after paragraph 1.02.F of the General Conditions:

“G. He, Him, His, Himself:

1. Where references are made in the Contract Documents and/or Specifications to the terms “he, him, his, himself,” or variations thereof, these shall be construed as being gender inclusive, and reference the terms “she, her, hers, herself,” or variations thereof as well.”

ARTICLE 2 - PRELIMINARY MATTERS

SC-2.01.C

Delete paragraph 2.01.C of the General Conditions in its entirety.

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

SC-5.04

Delete paragraph 5.04 of the General Conditions in its entirety and insert the following in its place:

“5.04 Differing Subsurface or Physical Conditions

In accordance with Massachusetts General Laws Chapter 30 Section 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, 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.”

SC-5.05.A.2.d

Add the following new paragraph immediately after paragraph 5.05.A.2.d of the General Conditions:

“e. Contractor’s attention is directed to the requirements of Massachusetts General Law Chapter 82 Section 40, regarding the notification of owners of underground facilities.”

ARTICLE 6 - BONDS AND INSURANCE

SC-6.02.A

In the first sentence of paragraph 6.02.A delete the words “Owner and”.

SC-6.02.A

Add the following sentence immediately after paragraph 6.02.A of the General Conditions:

“Refer to the table in SC-6.03 for these insurance requirements.”

SC-6.02.B

In the first sentence of paragraph 6.02.B delete the words “Owner or”.

SC-6.02.D

Delete paragraph 6.02.D of the General Conditions in its entirety.

SC-6.02.E

Delete paragraph 6.02.E of the General Conditions in its entirety and replace with the following:

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

SC-6.02.I

Delete paragraph 6.02.I of the General Conditions in its entirety.

SC-6.03

The limits of liability for the insurance required by paragraph 6.03 of the General Conditions shall provide the following coverage’s for not less than the following amounts or greater where required by Laws or Regulations:

**1. Indemnification**

The Contractor shall indemnify, defend, and save harmless the TOWN, all of the TOWN officers, agents and employees from and against all suits and claims of liability of every name and nature, including attorney’s fees and costs of defending any action or claim, for or on account of any claim, loss, liability or injuries to persons or damage to property of the TOWN or any person, firm, corporation or association arising out of or resulting from any act, omission, or negligence of the Contractor, subcontractors and their agents or employees in the performance of the work covered by this Agreement and/or their failure to comply with terms and conditions of this Agreement. The foregoing provisions shall not be deemed to be released, waived or modified in any respect by reason of any surety or insurance provided by the Contractor under contract with the TOWN.

**2. General Requirements**

(a) The Contractor shall, before commencing performance of the contract, be responsible for providing and maintaining insurance coverage in force for the life of the contract of the kind and in adequate amounts to secure all of the obligations under the contract and with insurance companies acceptable to the Town of Barnstable. All such insurance carried should not be less than the kinds and amounts designated herein, and the Contractor agrees that the stipulation herein of the kinds and limits of coverage shall in no way limit the liability of the Contractor to any such kinds and amounts of insurance coverage. Under all insurance coverage, required or not required by the Town, the

Contractor shall defend, indemnify, and hold harmless the Town of Barnstable, its elected or duly appointed offices, directors and employees against any claim based upon negligent, accidental or intentional acts or omissions of the contractor, its employees or its agents in providing its services to employees of the municipality or their dependents pursuant to the agreement.

(b) With the exception of Professional Services Liability for architects, designers and engineers, and Worker's Compensation, the Town of Barnstable and its employees must be named as an additional insured and a certificate of insurance will be provided indicating such for each of the insurance policies or surety bonds obtained pursuant to the requirements established by the issuance of the contract. Upon execution of the contract the Contractor will provide copies of certificates of insurance to the Town of Barnstable, Procurement & Risk Management.

(c) Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of this contract, and shall constitute sufficient grounds for immediate termination of the same. All insurance maintained as provided for in the above shall be taken out and maintained at the sole expense of the Contractor. Annually, at time of vendor's policy renewal, updated insurance certificates shall be sent to the Town of Barnstable, Procurement & Risk Management.

(d) No cancellations of such insurance, whether by the insurer or by the insured party shall be valid unless written notice thereof is given by the parties proposing cancellation to the other party and to the Town of Barnstable at least thirty (30) days prior to the intended effective date thereof, which date shall be expressed in said notice, and which shall be sent out by registered mail, return receipt requested. These provisions shall apply to the legal representatives, trustees in bankruptcy, receiver, assignee, and/or the successor in interest of the Contractor.

(e) All insurance coverage shall be placed with such company as may be acceptable to the Town of Barnstable and shall constitute a material part of the contract documents.

3. **Comprehensive General Liability Insurance**

The Contractor shall carry Commercial General Liability Insurance with an each occurrence limit of liability no less than One Million Dollars (\$1,000,000.00) and a general aggregate limit of liability no less than Two Million Dollars (\$2,000,000.00); and a Products/Completed Operations (*as may be required*) Aggregate limit no less than Two Million Dollars (\$2,000,000.00) for all injury and damages to or destruction of property during the policy period.

4. **Automobile Liability and Property Damage Insurance**

The Contractor shall carry business Automobile Liability Insurance covering all owned vehicles with a combined single limit no less than One Million Dollars (\$1,000,000.00) to cover all damage caused by contracted employees of the awarded Contractor. Level of insurance must adequately cover the liability exposure of project site and is subject to Town of Barnstable Risk Manager approval.



5. **Workers' Compensation Insurance**

The Contractor shall carry Workers' Compensation Insurance as required by Massachusetts General Law, c. 152, and Section 25, with a minimum limit of Employer's Liability as per Massachusetts General Law requirements.

6. **Excess Liability Insurance**

The Contractor shall carry excess liability insurance of not less than One Million Dollars (\$1,000,000.00) covering over general liability, automobile, and worker's compensation insurance.

7. **Pollution Liability Insurance**

The Contractor shall carry pollution liability insurance providing for a limit of not less than One Million Dollars (\$1,000,000.00), adding the Town as an additional insured. The coverage must extend to first party liability, third party liability and include remediation expense, outside the limits of liability, of a minimum of One Million Dollars (\$1,000,000.00).

SC-6.03.G

Delete paragraph 6.03.G of the General Conditions in its entirety.

SC-6.04

Delete paragraph 6.04 of the General Conditions in its entirety.

SC-6.06.A

Delete paragraph 6.06.A of the General Conditions in its entirety.

SC-6.07.

Delete SC-6.07 of the General Conditions in its entirety.

ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES

SC-7.02.B

Add the following new paragraphs immediately after paragraph 7.02.B of the General Conditions:

"C. Regular working hours are defined as eight (8) hours per day, Monday through Friday, excluding holidays, between the hours of 7:00 AM and 6:00 PM. 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 (2) hours notice is given to Engineer."

"D. 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 hours stipulated in Article

SC-7.02.C. At Owner's option, overtime costs may either be deducted from the Contractor's monthly payment request or deducted from the Contractor's retention prior to release of final payment. Overtime costs for the Owner's personnel shall be based on the individual's current overtime wage rate. Overtime costs for personnel employed by the Engineer or Owner's independent testing laboratory shall be calculated in accordance with the terms of their respective contracts with the Owner."

"E. This agreement is subject to the applicable provisions of the Contract Work Hours and Safety Standards Act, Public Law 87-581 87<sup>th</sup> Congress. No Contractor or Subcontractor contracting for any part of the Work shall require or permit any laborer or mechanic to be employed on the Work in excess of forty hours in any work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times that persons basic rate of pay for all hours worked in excess of forty hours in such work week."

"F. Contractor and Subcontractors shall, insofar as practicable, give preference in the hiring of workers for the Project to qualified local residents with first preference being given to citizens of the United States who have served in the armed forces of the United States and have been honorably discharged therefrom or released from active duty therein."

#### SC-7.06.A

Delete paragraph 7.06.A of the General Conditions in its entirety and insert the following in its place:

"A. 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."

#### SC-7.06.B

Delete paragraph 7.06.B of the General Conditions in its entirety.

#### SC-7.06.C

Delete paragraph 7.06.C of the General Conditions in its entirety.

#### SC-7.06.D

Delete paragraph 7.06.D of the General Conditions in its entirety.

#### SC-7.06.E

Delete paragraph 7.06.E of the General Conditions in its entirety.

#### SC-7.06.F

Delete paragraph 7.06.F of the General Conditions in its entirety.

SC-7.06.G

Delete paragraph 7.06.G of the General Conditions in its entirety.

SC-7.06.L

Add the following language at the end of paragraph 7.06.L of the General Conditions:

“Except as required otherwise by Massachusetts General Law, Chapter 149, Section 44F.”

SC-7.06.N

Add the following language at the end of paragraph 7.06.N of the General Conditions:

“Owner or Engineer may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable, information about amounts paid on their behalf to Contractor in accordance with Contractor’s Application for Payment.”

SC-7.06.O

Add the following new paragraph immediately after paragraph 7.06.O of the General Conditions

“P. Contractor shall make payments to Subcontractors in accordance with Massachusetts General Law, Chapter 30, Section 39F.”

SC-7.09.A

Add the following new paragraph immediately after paragraph 7.09.A of the General Conditions:

“B. The materials and supplies to be used in the Work under this Contract are exempt from the Commonwealth of Massachusetts Sales and Use Tax. Contractor shall obtain the proper certificates, maintain the necessary records and otherwise comply with the requirements of Chapter 14 of the Acts of 1966 and any amendments thereto.”

SC-7.10.C

Add the following new paragraph immediately after paragraph 7.10.C of the General Conditions:

“D. Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.”

SC-7.11.A

Add the following new paragraph immediately after paragraph 7.11. A of the General Conditions:

“B. Contractor shall return to Engineer, one set of the Contract Drawings overmarked in colored pencil, showing all changes made during construction and including the location, by dimensions and elevations, of installed equipment, and underground facilities that will become hidden or buried by the construction. This shall include ties to all valves, fittings, couplings, corporations, etc. measured from permanent structures.”

#### SC-7.18.A

Add the following language at the end of paragraph 7.18.A of the General Conditions:

“If through the acts of neglect on the part of Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the Work, Contractor shall settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against Owner on account of any damage alleged to have been sustained, Owner shall notify Contractor, who shall indemnify and save harmless Owner against any such claims.”

#### SC-7.18.C

Delete SC-7.18.C of the General Conditions in its entirety.

#### SC-7.19.E

Add the following new paragraph immediately after paragraph 7.19.E of the General Conditions:

“7.20 Contractor’s Records

A. Contractor shall comply with all applicable provisions of Chapter 30, Section 39R of the Massachusetts General Laws regarding Contractor’s records.”

### ARTICLE 9 - OWNER’S RESPONSIBILITIES

#### SC-9.06

Delete paragraph 9.06 of the General Conditions in its entirety.

### ARTICLE 10 - ENGINEER’S STATUS DURING CONSTRUCTION

#### SC-10.07.A

Add the following new paragraph immediately after paragraph 10.07.A of the General Conditions:

“B. In accordance with Massachusetts General Law Chapter 30, Section 39P every contract subject to Section 39M of this Chapter or Section 44A of Chapter 149 which requires the awarding authority, or 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."

#### ARTICLE13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

##### SC-13.01.B.1

Delete the second sentence in paragraph 13.01.B.1 of the General Conditions and replace it with the following:

“Such employees shall include foremen at the site.”

##### SC-13.02 Allowances

Delete Paragraph 13.02 of the General Conditions its entirety.

#### ARTICLE14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

##### SC-14.06.A

Add the following new paragraph immediately after paragraph 14.06.A of the General Conditions:

“B. If Owner stops Work under paragraph 14.06.A, Contractor shall not be entitled to any extension of Contract Time or any increase in Contract Price.”

##### SC-14.07.A

In the first sentence of paragraph 14.07.A delete the word “seven” and replace with the word “ten”.

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

##### SC-15.01.B.3

Add the following new paragraph immediately after paragraph 15.01.B.3 of the General Conditions:

“4. Contractor shall furnish evidence that payment received on the basis of materials and equipment not incorporated and suitably stored, has in fact been paid to the respective

supplier(s) within sixty days of payment by Owner. Failure to provide such evidence of payment may result in the withdrawal of previous approval(s) and removal of the cost of related materials and equipment from the next submitted Application for Payment.”

SC-15.01.C.1

Delete paragraph 15.01.C.1 of the General Conditions and replace it with the following:

“1. Progress Payments shall be made in accordance with Massachusetts General Laws, Chapter 30, Section 39K.”

SC-15.02.A

Add the two following new paragraphs immediately after paragraph 15.02.A of the General Conditions:

“B. No materials or supplies for the Work shall be purchased by Contractor or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. Contractor warrants that Contractor has good title to all materials and supplies used by Contractor in the Work, free from all liens, claims or encumbrances.”

“C. Contractor shall indemnify and save Owner harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. Contractor shall at Owner’s request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If Contractor fails to do so, then Owner may, after having served written notice on the said Contractor, either pay unpaid bills, of which Owner has written notice, direct, or withhold from the Contractor’s unpaid compensation, a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged; whereupon payment to Contractor shall be resumed in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligation upon Owner to either Contractor, or Contractor’s Surety. In paying any unpaid bills of the Contractor, Owner shall be deemed the agent of Contractor and any payment so made by Owner shall be considered as payment made under the Contract by Owner to Contractor and Owner shall not be liable to Contractor for any such payment made in good faith.”

SC-15.06.B.1

Delete paragraph 15.06.B.1 of the General Conditions and replace it with the following:

“1. If, on the basis of Engineer’s observations of the Work during construction and final inspection, and Engineer’s review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor’s other obligations under the Contract Documents have been fulfilled, Engineer will indicate in writing Engineer’s

recommendation of payment and present the Application for Payment to Owner for payment. Thereupon Engineer will give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of paragraph 15.01. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment. If the Application and accompanying documentation are appropriate as to form and substance, Owner shall in accordance with the Applicable Massachusetts General Law, pay Contractor the amount recommended by the Engineer.”

#### ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

##### SC-16.01.A

Delete paragraph 16.01.A of the General Conditions in its entirety and insert the following in its place:

"A. Owner may order, at any time and without cause, suspension of the Work in accordance with Massachusetts General Laws, Chapter 30, Section 39O.

##### SC-16.02.A.4

Add a new paragraph immediately after paragraph 16.02.A.4 of the General Conditions.

“5. If Contractor abandons the Work, or sublets this Contract or any part thereof, without the previous written consent of Owner, or if the Contract or any claim thereunder shall be assigned by Contractor otherwise than as herein specified.”

#### ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

##### SC 17.01.B

Add a new paragraph after paragraph 17.01.B of the General Conditions:

“C. Contractor shall carry on the Work and maintain the progress schedule during the dispute resolution proceedings, unless otherwise agreed by Contractor and Owner in writing.”

#### ARTICLE 18 - MISCELLANEOUS

##### SC-18.01.A.2

Add the following new paragraph immediately after paragraph 18.01.A.2 of the General Conditions:

“3. Both the address given in the Bid Form upon which this Agreement is founded, and Contractor 's office at or near the site of the Work are hereby designated as places to either of which notices, letters, and other communications to Contractor shall be certified, mailed, or delivered. The delivering at the above named places, or depositing in a postpaid wrapper directed to the first-named place, in any post office box regularly maintained by the post office department, of any notice, letter or other communication to Contractor shall be deemed sufficient service thereof upon Contractor; and the date of said service shall be the date of such delivery or mailing. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by Contractor, and delivered to Owner and Engineer. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon Contractor personally.”

SC-18.07.A

In paragraph 18.07.A, delete the words “state in which the Project is located” and substitute “Commonwealth of Massachusetts”.

SC-18.08

Add the following new paragraph immediately after paragraph 18.08 of the General Conditions:

“SC-18.09 Wage Rates

“A. The requirements and provisions of all applicable laws and any amendments thereof or additions thereto as to employment of labor, and to the schedule of minimum wage rates established in compliance with laws shall be a part of these Contract Documents. A copy of the wage schedule is included in in this Specification (Appendix D). If after the Notice of Award, it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the officials administrating the laws mentioned above.

Such approved minimum rate shall be retroactive to the time of the initial employment of such person in such trade or occupation. Contractor shall notify Owner of Contractor’s intention to employ persons in trades or occupations not classified in sufficient time for Owner to obtain approved rates for such trades or occupations.”

“B. The schedule of wages referred to above are minimum rates only, and Owner will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage in excess of the applicable rate contained in these Contract Documents. All disputes in regard to the payment of wages in excess of these specified in the schedule shall be resolved by Contractor.”

SC-18.09

Add the following new paragraph immediately after paragraph 18.09 of the Supplementary Conditions:



“SC-18.10 Commonwealth of Massachusetts Provisions”

- A. See Specification Section 00820 COMMONWEALTH OF MASSACHUSETTS SPECIAL CONDITIONS, Appendix F.”

END OF SUPPLEMENTARY CONDITIONS

INDEX

DIVISION 1 GENERAL REQUIREMENTS

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## SECTION 01010

### SUMMARY OF WORK

#### PART 1 GENERAL

##### 1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. The work to be performed under the Base Bid of this contract includes, but is not limited to rehabilitation and site improvements at the Mary Dunn No. 1 Water Storage Tank, a 0.37 million gallon riveted steel standpipe. Tank rehabilitation includes demolition of the existing wood and rolled asphalt tank roof, support structures, and center rigging post assembly, furnishing and installing a new factory coated, FAA compliant, aluminum geodesic dome roof with appurtenances including new finial vent, two (2) roof access hatches, safety handrails, and roof ladder with fall arrest cable system; rivet repair and steel overlap seam repair of the tank walls; reconditioning of the tank foundation concrete ringwall, and miscellaneous repairs including modification of the existing overflow pipe, removal of existing access ladder and cage, and furnishing and installing a new access ladder, cage, ladder security gate, and safety climb device. Tank site improvements include furnishing and installing new fence and double gate, relocating existing pedestrian gate and portions of existing fence, install new FOB Reader mount for pedestrian gate, furnishing and installing barbed wire on portions of existing fence, electric barrier gate and FOB Reader mounts, modifications to the existing SCADA antenna mount and conduit, and associated SCADA integration, FOB integration, loam and seed and crushed stone ground cover, gravel access road and associated improvements to the entrance at Mary Dunn Road.
- B. The work to be performed under Alternate 1 of this contract includes, but is not limited to paving the access road.
- C. Should the Awarding Authority choose to include Alternate 1, Bid Item No. 15 in the Base Bid will be replaced with work included under Alternate 1.
- D. Details of paving the access road included under Alternate 1 are further described in Specification Section 02513, Asphaltic Pavement.
- E. Details of demolition of the existing roof, support structure and center rigging post assembly, and installation of the new aluminum dome tank roof and appurtenances, are further described in Specification Section 02070 Selective Demolition and Section 05520 Aluminum Dome Roof, respectively.
- F. Details of installation of the new 8-foot high chain link fence with barbed wire and double gate, and new 5-foot high chain link fence are further described in Specification Section 02444 Vinyl Coated Chain Link Fence and Gate.
- G. Details of installation of the new barrier gate and associated electrical work are further described in Specification Section 02829 Barrier Gate, Division 16 Electrical and Drawing C-2.

- H. Details of crushed stone ground cover and filter fabric are further described in Specification Section 02222, Earthwork.
- I. Details of loam and seed ground cover are further described in Specification Section 02930, Loam and Seed.
- J. See Specification Section 00100, Instructions to Bidders, for construction dates.
- K. Contractor shall submit a schedule of work, including demolition and construction sequence, and anticipated date the tank is to be out of service, to the Owner and Engineer for review prior to the start of construction.
- L. The Contractor shall coordinate his work on the Mary Dunn No. 1 Water Storage Tank with the Barnstable Department of Public Works in sufficient time so that the tank can be drained as far down as possible prior to start of any demolition work. No demolition shall take place without the approval of Owner and Engineer. The tank shall remain in service until September 15, 2017, and be back in service by November 15<sup>th</sup>, 2017.

1.02 RELATED WORK

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

1.03 DESCRIPTION

- A. The work of this Section consists of the following:
  1. FAA Requirements
  2. Foundation Reconditioning
  3. Rivet and Steel Overlap Seam Repairs
  4. Miscellaneous Rehabilitation
  5. SCADA Antenna Improvements
  6. FOB Reader
  7. Gravel Access Road and Entrance Improvements
  8. Additional Fence Work
  9. Permits
  10. Dissimilar Metals
  11. Disinfection and Bacteriological Testing of Tank Interior
  12. Volatile Organic Chemical Analysis

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 FAA REQUIREMENTS

- A. Contractor shall note that the project is located within the limits of the Federal Aviation Administration (FAA) jurisdiction, and is subject to the requirements identified in the FAA Aeronautical Study, included in Appendix E of these specifications.

- B. The Contractor shall be responsible for reviewing and adhering to all requirements of the FAA Aeronautical Study.

### 3.02 FOUNDATION RECONDITIONING

- A. Contractor shall repair areas of concrete grout at the junction of the foundation and floor plate that have begun to deteriorate. Repairs shall be made using high strength non-shrink cement grout after the floor plate extension has been repaired and recoated.
- B. After grout areas have been repaired, junction between the floor plate and extension and the foundation shall be sealed with an elastomeric sealant (i.e. Silkaflex 2c).
- C. Reconditioning and repair of the exposed concrete foundation ring shall be conducted in accordance with the procedures outlined in Specification Section 03600, Grout.
- D. Foundation anchor bolts and stools shall be power tool cleaned and spot coat repairs applied in accordance with surface preparation and coating system identified in Specification Section 09970, Power Tool Clean and Spot Coat Painting Repairs.

### 3.03 RIVET AND STEEL OVERLAP SEAM REPAIRS

- A. Exterior and interior surface preparation for rivet and steel overlap seam repairs:
  - 1. Shall be in accordance with SSPC-SP11, Power Tool Cleaning.
- B. The tank exterior and interior, where spot coat repairs are required for rivet and steel overlap seams shall receive one (1) polyamide epoxy prime coat, and one (1) modified polyurethane coat, after the prime coat has cured, in accordance with 09970, Power Tool Cleaning and Spot Coat Painting Repairs, 2.02 (B).
- C. Upon completion of application of the polyamide epoxy and modified polyurethane, interior and exterior repaired areas shall be spot coat painted in accordance with Specification Section 09970, Power Tool Cleaning and Spot Coat Painting Repairs, 2.02 (C), and 3.07 (J).

### 3.04 MISCELLANEOUS REHABILITATION

- A. Overflow System Modification (See Drawing C-3).
  - 1. Flanged Check Valve
    - a. The existing overflow outlet shall be modified to include a flanged check valve, as described below, and depicted on Drawing C-3.
    - b. Flanged flap valve shall be equal to a cast iron, flanged, flap valve, Model No. PF-25, manufactured by Waterman Industries, or approved equal.
  - 2. Details
    - a. Contractor shall note that the existing 6-inch overflow pipe transitions from steel to PVC, approximately 20 feet above grade.
    - b. Cut existing 6-inch steel overflow pipe above the existing coupling to remove PVC section of pipe. See Appendix B for existing photographs.

- c. Weld approximately 20 feet of new 6-inch steel pipe to existing overflow pipe.
  - d. Weld 90-degree steel elbow to new 6-inch steel overflow pipe near ground level.
  - e. Weld piece of 6-inch pipe to a new flanged 90-degree steel elbow to affix new 6-inch flanged flap valve as depicted on plans. Provide a new #24 stainless steel screen between flanges.
  - f. Provide a 12-inch clearance between the end of the flap valve and existing sloped overflow swale.
  - g. Install one angle iron support welded to tank approximately 10 feet above grade, as depicted on plans.
  - h. All welded areas shall be coated in accordance with Specification Section 09970, Power Tool Clean and Spot Coat Painting Repairs.
  - i. All new steel pipe installed shall be factory cleaned and coated in accordance with Specification Section 09970, Power Tool Clean and Spot Coat Painting Repairs.
- B. Remove existing ladder and cage, and install new coated steel access ladder, safety cage, ladder security gate and fall arrest cable system.
- 1. Existing tank standoffs for ladder support shall remain. New ladder and cage shall be welded to the existing tank standoffs.
  - 2. New ladder and cage shall be steel and factory cleaned and coated in accordance with Specification Section 09970, Power Tool Clean and Spot Coat Painting Repairs.
  - 3. New ladder and cage shall match existing ladder and cage dimensions.
  - 4. Fabricate a new steel security gate at the base of the ladder that is capable of being locked to prevent unauthorized access as depicted on Drawing C-3. New security gate shall be factory cleaned and coated in accordance with Specification Section 09970, Power Tool Clean and Spot Coat Painting Repairs.
  - 5. Ladder safety climb device shall be manufactured by DBI Sala (Lad-Saf Flexible Cable Ladder Safety System), Reference No. 6116507, or approved equal.
- C. Install fall arrest cable system for new roof ladder.
- 1. See Specification Section 05520, Aluminum Dome Roof, for new roof ladder details.
  - 2. Roof ladder safety climb device shall be Safety line as manufactured by DBI Industries (Lad-Saf Flexible Cable System), Model 1107800, or approved equal.

### 3.05 SCADA ANTENNA IMPROVEMENTS

- A. Contractor shall note that one (1) SCADA antenna, Model ANT 450F6 manufactured by Telewave, Inc., owned by the Barnstable Department of Public Works currently exists on the top of the ladder cage. The Contractor shall not commence tank rehabilitation activities until the SCADA antenna is temporarily relocated.
- 1. The Contractor shall coordinate and execute the temporary relocation and permanent reinstallation of the SCADA antenna with the antenna maintenance personnel. Please note the following contact information for antenna maintenance personnel:

Dean Marengi  
TCS Communications Group  
Phone: 508-726-3482  
[Dean.marengi@tcscommunications.com](mailto:Dean.marengi@tcscommunications.com)  
[Damtc@aol.com](mailto:Damtc@aol.com)

2. Permanently reinstall the SCADA antenna where previously mounted and at the current elevation, at the top of the ladder cage, as depicted on the drawings.
  3. A cash allowance of \$2,500 has been allotted for coordination with the Town's antenna maintenance personnel. Contractor shall be reimbursed the actual cost of work conducted by TCS Communications Group based upon paid invoices submitted in advance, without markup.
- B. Contractor shall note that the existing SCADA antenna cable is exposed from the antenna at the top of the ladder cage, the full length of the existing ladder cage, before entering an existing conduit at the base of the ladder cage. The existing conduit is mounted to a support bracket from the bottom of the ladder cage to a junction box at ground level. Refer to Appendix B for existing photographs.
1. Contractor shall remove existing antenna conduit and support bracket.
  2. Furnish and install new 30-foot high (above ground), 2-1/2-inch outside diameter galvanized steel post, set to a depth of 3 feet encased in concrete as depicted on Drawing C-3.
  3. Furnish and install new 2-inch galvanized steel conduit from the existing junction box, the full length of the ladder cage, and terminate at the permanent location of the SCADA antenna on the ladder cage, utilizing the new steel post for support, as depicted on the drawings.
  4. New steel conduit shall be affixed to the new steel post and ladder cage exterior with conduit brackets, and maintain a 10-inch offset from the tank at all locations.
    - a. No additional welding to the tank will be allowed.
    - b. Tank coating touchup of areas where existing support bracket for conduit was removed will be required, and coated in accordance with Specification Section 09970, Power Tool Clean and Spot Coat Painting Repairs.
  5. Contractor shall furnish and supply new flexible, low loss communications coat cable, Model LMR-600 as manufactured by Times Microwave System.
    - a. New communications cable shall be installed from the permanent location of the SCADA antenna mounted on the ladder cage, through the new steel conduit affixed to the ladder cage exterior and new steel post, into the junction box, as shown on the Contract Drawings.
    - b. The new antenna cable shall be continuous from the SCADA antenna to the junction box. Spliced cable will not be allowed.
    - c. It is the Contractor's responsibility to confirm the length of continuous cable needed in the field once the permanent location of the SCADA antenna has been determined.

### 3.06 FOB READERS

- A. Three new FOB Readers shall be installed as part of the tank site security system. Two shall be installed on either side of the barrier gate at the entrance of the access road, and one shall be installed at the 3-foot wide pedestrian swing gate, as depicted on the Contract Drawings.
- B. Contractor shall coordinate materials and installation with the Town's security personnel. A cash allowance of \$30,000 has been allotted for coordination with the Town's security personnel. Contractor shall be reimbursed the actual cost of work conducted by Securadyne Systems based upon paid invoices submitted in advance, without markup. Please note the following contact information for security personnel:

James E. McDonald, PSNA  
Securadyne Systems  
Phone: 800-354-2616  
Cell: 978-447-0199  
[James.McDonald@Securadyne.com](mailto:James.McDonald@Securadyne.com)

- C. Securadyne Systems will supply the following field devices and components required for FOB Readers at each gate as part of the cash allowance:
  - 1. S2:Micro Node Plus
  - 2. HID:RP40 MultiClass SE E Reader
  - 3. HID:Proxpro II Wiegand, Black, No Keypad
  - 4. UTC:Surface mount armored contact
  - 5. UTC:Spacer for 2505A (Black)
  - 6. UTC:L Bracket for 2207-Ah/2215/2505 Seri
  - 7. SS:18-2C Shld Direct Burial cable (Black)
  - 8. SS:18-4PR Ind Shld Direct Burial cable (Black)
  - 9. TL:Cat6 UTP Gigabit Ethernet Patch Cable
  - 10. ALT:DC power supply, 24 vdc, 10-amp, 4
  - 11. ALT:Lead Acid Battery, 12 VDC 7AH and
  - 12. CMN:Hardened Midspan POE Injector.
- 3. Securadyne Systems will complete the following installation:
  - 1. Install, connect and test all field devices and equipment provided by Securadyne.
  - 2. Complete all programming and integration required for functional operation of the FOB Readers with the Town's existing security system.
- 4. Contractor shall furnish and install the following components required for complete operation of the FOB Reader's system, as shown on the Contract Drawings:
  - 1. Mount for each FOB Reader: PCE: Card Reader Pedestal, Model No. 42-9C-BLK, as manufactured by Pedestal CEO, or approved equal, as shown on the Contract Drawings.
  - 2. Housing for each FOB Reader: HSG:7x7x4 Housing, Black, Model No. PCH049, as manufactured by The Housing Company, or approved equal.
  - 3. New UL-Listed, 240/120V, Single Phase, 6-Circuit main breaker, 10 KAIC, NEMA 1 Enclosure and associated conduit, in the Control Building.



4. Conduit Schedule Set A: (2) 1-1/2-inch Schedule 40 PVC conduits from the new circuit breaker in the Control Building to the FOB reader for the pedestrian gate, including wall penetration of the Control Building. All spare conduits shall be equipped with a pull string.
5. Conduit Schedule Set B: (5) 1-1/2-inch Schedule 40 PVC conduits from the new circuit breaker in the Control Building (including wall penetration of the Control Building) to the barrier gate and FOB operators at the barrier gate. Encase conduits in concrete where noted on the Contract Drawings. All spare conduits shall be equipped with a pull string.
6. Electric handholes as indicated on the Contract Drawings.
7. 120v power supply cable enclosed in Conduit No. 1, Set A and B, from FOB Reader(s) to new circuit breaker in the Control Building.
8. Install FOB Communication Cables (supplied by Securadyne Systems) enclosed in Conduit No. 2, Set A and B, from FOB Reader(s) to S2:Micro Note Plus in Control Building.
9. Contractor shall confirm the length of all conduit and cables required in the field.
10. Additional cable, electrical conduit, back boxes and miscellaneous materials as necessary.

### 3.07 GRAVEL ACCESS ROAD AND ENTRANCE IMPROVEMENTS

- A. Furnish and install new barrier gate at the entrance of the access road.
  1. Barrier gate shall be installed at the location as depicted on Drawing C-2, and in accordance with Specification Section 02829 Barrier Gate.
  2. Contractor shall furnish and install power supply cable and conduit as indicated on the Contract Drawings from the barrier gate to new circuit breaker in the control building per the manufacturer's recommendations.
- B. Clear and grub the access road entrance from Mary Dunn Road within the limits of work depicted on Drawing C-2, in accordance with Specification Section 02110, Clearing and Grubbing. Areas to be cleared and grubbed shall be flagged by the Contractor and reviewed with the Engineer prior to clearing.
- C. Install and uniformly grade dense graded crushed stone between the 12-foot wide access road and limit of clearing at the access road entrance as indicated as the Gravel Drive on Drawing C-2.
- D. Uniformly grade the access road within the limits of the new access road to the proposed elevations as depicted on the Contract Drawings, including adjacent transition areas.
  1. New access road width shall be as defined on the Contract Drawings.
  2. Smooth the finished surfaces within specified tolerances.
  3. This work shall be completed under the Base Bid, and Alternate No. 1 should the Awarding Authority choose to include.
- E. Install 6-inch rip rap and slope stabilization at locations defined on Drawing C-2.
- F. Install timber guardrail at locations defined on the Contract Drawings, in accordance with Specification Section 02840, Timber Guardrail.

- G. Contractor shall note that two existing 16-inch cast iron water main pipes cross the gravel driveway at the control building approximately 3 feet below grade, as shown on Drawing C-1. These mains connect the water storage tanks to the water distribution system and are a crucial component in the system. The use of vibration compaction equipment within 10 feet of the water main is prohibited. Compaction by hand shall be completed within 10 feet of the water main to satisfactory compaction standards.

### 3.08 ADDITIONAL FENCE WORK

- A. The existing 3-foot wide pedestrian gate shall be relocated as shown on Drawing C-1. Install barbed wire on the pedestrian gate to match the new 16-foot wide double gate.
- 5. Relocate the recently installed chain link fence (without barbed wire) as shown on Drawing C-1. Install barbed wire on this section of fence to match the new fence.

### 3.09 PERMITS

- A. The Contractor is responsible for obtaining all necessary electrical permits for installation of the electric barrier gate, security system components, SCADA antenna components, and associated electrical work from the Town of Barnstable, and pay for all associated permit fees.
- B. The Contractor is responsible for obtaining all necessary building permits associated with demolition of the existing wood and rolled asphalt tank roof, support structures, and center rigging post assembly, and furnishing and installing a new factory coated, FAA compliant, aluminum geodesic dome roof with appurtenances. Contractor shall pay for all associated permit fees.
- C. The Contractor shall coordinate with the Town of Barnstable for any other applicable access permits, trench permits, site inspections or any other permit required by the Town. Contractor shall pay for all permit fees.

### 3.10 DISSIMILAR METALS

- A. Dissimilar metals among the tank, aluminum dome roof and all appurtenances shall be isolated by means of a compatible elastomeric gasket on other means approved by materials manufacturer's and Engineer.

### 3.11 DISINFECTION AND BACTERIOLOGICAL TESTING OF TANK INTERIOR

- A. The CONTRACTOR shall disinfect the interior of the water chamber after the new roof is installed, and interior cleaning, spot coat repair painting, rivet repair, and steel overlap seam repair operations are completed and after a solvent rub test has been performed to determine an acceptable state of cure. The tank is not to be disinfected until the interior coatings are fully cured. The contractor is cautioned that it is the CONTRACTOR'S responsibility to confirm that the coatings are sufficiently cured prior to returning the tank to active service. Heat and forced ventilation may be required to achieve the required results at no additional cost to the OWNER.

- B. The tank shall be disinfected in conformance with the requirements of applicable AWWA Standards. Following completion of painting, curing and acceptance, the CONTRACTOR shall disinfect the tank prior to returning it to service. Disinfection and sampling shall be performed in accordance with Chlorination Method 2 of AWWA C652-11 or latest revision thereof as modified herein, and will be the sole responsibility of the CONTRACTOR. The CONTRACTOR will supply all the necessary equipment and materials for this procedure, and copies of the test results shall be provided to the OWNER.
1. All surfaces of the water storage facilities shall be cleaned thoroughly using a high pressure water jet, sweeping, scrubbing, or equally effective means.
  2. All water, dirt and debris accumulated in this cleaning operation shall be removed before disinfecting.
  3. Chlorination shall be by any of the three methods described in AWWA C652.
  4. The surfaces to be chlorinated shall be the floor and walls in the tank.
  5. After the tank has been cleaned to the satisfaction of the Owner, the walls and floor of the tank shall be sprayed with a 200 ppm chlorine solution. Excess chlorine solution shall then be rinsed and drained from the tank, and the tank shall then be filled with fresh water from the supply system.
  6. After completion of the disinfection, water from the tank shall not be admitted to the distribution system until a satisfactory laboratory examination, including chlorine residual, bacteriological tests and organic tests have been obtained. Testing shall ensure that the water meets the standards set forth by the Massachusetts Department of Environmental Protection (MassDEP) for potable water supplies.
  7. In the event that a satisfactory bacteriological laboratory examination cannot be obtained, it will then be necessary to administer disinfection by filling the tank with 50 ppm chlorine solution and allowing it to stand for 24 hours. After the disinfection period, the tank shall be drained and refilled with potable water from the distribution system. The quality of the water in the tank should, upon test, be equal to the water in the distribution system, both chemically and bacteriological. The procedure should be repeated until water in the tank is satisfactory.
  8. In the event that a satisfactory chemical laboratory examination is not obtained, the tank shall be drained and the Contractor shall take necessary steps to assure that potable water quality standards are met, at no additional expense to the Owner.
  9. The Owner will furnish sufficient water, at reasonable rates of flow for rinsing and one filling, without cost to the Contractor. In case of subsequent fillings resulting from unsatisfactory laboratory examinations, material and retest shall be at the expense of the Contractor.
  10. The Contractor shall be responsible for properly disposing of all heavily chlorinated water, which is generated as a part of tank disinfection.
- C. At least two samples shall be collected at least 24 hours apart and must be free of Total Coliform and E. Coli.
- D. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until two consecutive satisfactory samples have been obtained. When the samples are satisfactory, and upon approval of the State/County Department of Health,

the Local Water Department/Company, the system may be placed in service. OWNER reserves the right to require the CONTRACTOR to re-disinfect the tank.

- E. OWNER shall supply water for initial filling. Additional water required due to a failed test shall be paid for by the CONTRACTOR at the current residential billing rate. All disinfection testing shall be paid for by the CONTRACTOR.

### 3.12 VOLATILE ORGANIC CHEMICAL ANALYSES

- A. The CONTRACTOR shall collect one sample for volatile organic chemicals on water from the filled tank, to test for proper curing, prior to the tank being placed on-line. The duration of water contact time with the tank prior to sampling shall be approved by the ENGINEER, and shall be up to one week. Samples shall be taken from the sample tap.
- B. Analyses shall be performed using EPA Method 501/502 or 524 by a laboratory certified by the State of Massachusetts for testing volatile organics in drinking water. Analyses shall include all "regulated" and "unregulated" volatile organics (except pesticides and herbicides) as defined in 310 CMR 22.07 along with other volatile organic compounds that are detected by the approved methods. The laboratory shall report all compounds detected whether or not they are listed in 310 CMR 22.07 or on the Massachusetts DEP reporting form for Volatile Organic Compounds.
- C. The CONTRACTOR shall provide the OWNER with written copies of all laboratory analyses. Water quality shall meet the requirements of the USEPA, Massachusetts DEP, and the OWNER prior to the tank being placed on-line.
- D. Should any volatile organic compounds exceed the maximum contaminant levels or if any contaminants are detected at levels of concern, CONTRACTOR shall drain tank, refill and retest until satisfactory results are obtained at the discretion of the OWNER.

END OF SECTION

## SECTION 01019

### DRAWINGS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. The Contract Drawings may be modified by addenda and shall be issued for construction purposes.
1. These Drawings may be supplemented or superseded by such additional general and detail drawings as may be necessary and desirable as the work progresses.
  2. The Drawings issued for construction at that time or after the signing of the Contract Documents shall become the Contract Drawings.
- B. Dimensions:
1. Except where noted, the Drawings are made to scale, but all working dimensions shall be taken from the figured dimensions or by actual measurements at the work, and in no case by scaling the prints.
  2. The Contractor shall study and compare all Drawings and verify all figures before laying out or constructing the work and shall be responsible for any and all errors in the Contract work which might have been avoided thereby.
  3. The Contractor shall take all measurements of existing established conditions notwithstanding the figured dimensions on the Drawings.
  4. When figured dimensions are not in agreement with the Contractor's measurements, the Engineer shall be immediately notified and the Engineer will promptly adjust the same.
  5. Whether or not an error is believed to exist, deviations from the Drawings and the dimensions given thereon shall be made only after approval in writing is obtained from the Engineer.
- C. Diagrammatic Drawings:
1. Plans or Drawings where the work is shown diagrammatically indicate approved working systems. Every piece of material, fittings, fixtures or small equipment is not shown, nor every difficulty or interference that may be encountered to carry out the true intent and purpose of the Contract Documents.
  2. All necessary parts to make complete, approved working systems or installation shall be included as if detailed on these Drawings.
  3. The location of pipe lines and appurtenances shown on the Drawings, unless exactly dimensioned, shall be considered as approximate only.
  4. The Contractor shall adjust the position of the pipe lines and appurtenances in accordance with good working practices to meet interferences, provide proper clearance and provide proper access space for operation and maintenance.
- D. Typical Details:
1. Where shown on the Drawings, typical details shall apply to each and every item of the Contract work where such items are incorporated and the detail is applicable.
  2. Unless noted otherwise, such typical details shall be applicable in full.

- E. Copies of Drawings Furnished:
1. The Engineer shall furnish the Contractor, without charge, up to six copies of the Drawings and Specifications for execution of the Contract work.
  2. Additional copies will be furnished at the Contractor's expense when requested, except that any copies of available plans and specifications returned from the bidders in good condition will be furnished to the Contractor without charge.
  3. All Drawings and Specifications are the property of the Owner.
  4. The Contractor shall return all copies if so requested.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 EXISTING AND ADJACENT CONDITIONS

- A. Wherever existing conditions or construction not required as part of the work of the Contract are shown, they are so shown as a source of information only. The Engineer, while believing such information is substantially correct, assumes no responsibility thereof.
1. Before starting any work that might be affected by such existing construction or conditions, the Contractor shall have made himself familiar with all conditions affecting the nature and manner of performing the work, and shall not be entitled to any extra compensation for any work or expense arising from or caused by his neglect to have verified all existing conditions and requirements.

3.02 DISCREPANCIES

- A. If the Contractor during the progress of the work discovers any discrepancies between the Drawings and the Specifications, the Specifications govern.
- B. In case of discrepancy between these Contract Documents and the Town of Barnstable Rules, Regulations and Standard Specifications, the most stringent governs.

END OF SECTION

SECTION 01020

ALLOWANCES

PART 1 GENERAL

1.01 DESCRIPTION

The stated allowances for the price adjustments as specified in Section 01025 Measurement and Payment:

Bid Item No. 20: FOB Readers, Equipment, and Integration: Thirty Thousand Dollars (\$30,000.00)

Payment shall be made from the stated allowance in the amount of \$30,000 noted under Item No. 20 in the Bid Form. Payment shall be full compensation for all costs associated with equipment supply, installation, connection and testing, as noted in Specification Section 01010, 3.06, and coordination with the Town's security contractor as required by the Contract Documents. Contractor shall be reimbursed the actual cost of coordination with the Town's security contractor based upon paid invoices submitted in advance, without mark-up.

Bid Item No. 21: SCADA Integration: Two Thousand Five Hundred Dollars (\$2,500.00)

Payment shall be made from the stated allowance in the amount of \$2,500 noted under Item No. 21 in the Bid Form. Payment shall be full compensation for all costs associated with coordination with the Town's antenna maintenance personnel as required by the Contract Documents. Contractor shall be reimbursed the actual cost of coordination with the Town's antenna maintenance personnel based upon paid invoices submitted in advance, without mark-up.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 01025 - Measurement And Payment

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

## SECTION 01025

### MEASUREMENT AND PAYMENT

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. The following sub-sections describe the measurement of and payment for the Work to be done under the items listed for the Base Bid and Alternate No. 1 in the BID TABLES.
- B. Each lump sum, unit price, and stated allowance price stated in the BID TABLES constitutes full compensation as herein specified for each item of work completed in accordance with the Contract Documents, including cleaning up.
- C. The Contractor shall carefully acquaint himself with all work associated with each payment item and shall have no claim for his unfamiliarity with the requirement of various items.

##### 1.02 GENERAL

- A. Each lump sum, unit price, and stated allowance bid item under Parts 2 and 3 of this specification section shall constitute full compensation for furnishing all labor, materials, tools, and equipment necessary to complete the Work, as required by the Contract Documents.
- B. For accounting purposes, for the Engineer's convenience and as an aid in determining progress payments and price additions or deductions for Contract modifications, the Contractor shall furnish to the Engineer a schedule of values which shall be approved.
- C. The price breakdown schedule shall apportion the total amount of the Contract price(s) for each separate item among the main features or costs that form the completed Work. The price breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, subcontract, and overhead costs, as well as profit, and shall cover all work involved for the properly completed item and feature listed.
- D. Any amount claimed for subcontracts shall be supported by a similar schedule of values with the total amount shown by this price under the Contract price stated in the Bid Form.
- E. All excavation and associated support is considered incidental to all associated bid items.

##### 1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 00300 Bid Form



PART 2 MEASUREMENT AND PAYMENT FOR BASE BID

2.01 ITEM No. 1 – DEMOLISH EXISTING ROOF AND SUPPORT STRUCTURES

- A. The lump sum bid price shall include mobilization, demobilization, all permits, all work related to the demolition of the existing wood and rolled asphalt tank roof, support structures, and center rigging post assembly, proper disposal of all debris, and disinfection and bacteriological testing of tank interior.

2.02 ITEM No. 2 – NEW ALUMINUM DOME ROOF, APPURTENANCES, AND COATING

- A. The lump sum price shall include all work related to furnishing and installing a new aluminum geodesic dome tank roof with appurtenances, including new finial vent, two (2) roof access hatches, safety handrails, and roof ladder. The lump sum bid price shall also include all work related to a factory-applied, FAA compliant coating system on the exterior of the new aluminum dome tank roof and associated installation permitting, and power tool cleaning and application of spot coat repairs to the tank rim, top ring angle and brackets. Existing tank coating damaged during construction shall be repaired to coating specified at the Contractor's expense.

2.03 ITEM No. 3 – RIVET REPAIR

- A. The per each bid price shall include all work related to surface preparation, including power tool cleaning the exterior and interior, application of industrial polyamide epoxy and modified polyurethane, and spot coat painting repairs to rivets requiring repairs, and disinfection and testing of tank interior.

2.04 ITEM No. 4 – STEEL OVERLAP SEAM REPAIR

- A. The per linear foot bid price shall include all work related surface preparation, including power tool cleaning the exterior and interior, application of industrial polyamide epoxy and modified polyurethane, and spot coat painting repairs to steel overlap seams requiring repairs, and disinfection and testing of tank interior.

2.05 ITEM No. 5 - FOUNDATION RECONDITIONING

- A. The lump sum bid price shall include all work related to reconditioning of the tank foundation concrete ringwall, including power tool cleaning and application of spot coating of the foundation anchor bolts and stools.

2.06 ITEM No. 6 – MISCELLANEOUS REHABILITATION

- A. The lump sum bid price shall include all work related to modifying the existing tank overflow outlet pipe, including power tool cleaning and application of spot coating required at welded areas, removal of existing ladder and safety cage, furnishing and installing a new coated steel access ladder and safety cage affixed to the existing tank standoffs with coated steel security gate, new safety climb device, and new roof ladder fall arrest cable system.

2.07 ITEM No. 7 - NEW 8-FOOT HIGH CHAIN LINK FENCE WITH BARBED WIRE

- A. The per linear foot unit bid price shall include all work related to furnishing and installing the new 8-foot high chain link fence with barbed wire, including concrete footings, at locations identified on the Contract Drawings. The price per linear foot shall also include payment for relocating existing fence where noted on the Contract Drawings, furnishing and installing barbed wire on existing fence at locations identified on the Contract Drawings, and removal and proper disposal of the existing rolling vehicle gate and chain link fence not being repurposed.

2.08 ITEM No. 8 – FENCE GATES

- A. The lump sum bid price shall include all work related to furnishing and installing the 16-foot wide double gate, relocating the existing three-foot wide pedestrian gate, addition of barbed wire to the pedestrian gate as noted on the Contract Drawings, and furnishing and installing a mount and housing for the pedestrian gate FOB Reader. Securadyne Systems will furnish, install, connect, and test the field devices associated with the FOB Reader, as identified in Specification Section 01010, Summary of Work. Payment for field devices supplied by Securadyne Systems and coordination and integration with the existing security system is included under Item No. 20 – Stated Allowance: FOB Readers, Equipment, and Integration.

2.09 ITEM No. 9 – NEW 5-FOOT HIGH CHAIN LINK FENCE

- A. The per linear foot unit bid price shall include all work related to furnishing and installing the new 5-foot high chain link fence, including concrete footings, at locations identified on the Contract Drawings.

2.10 ITEM No. 10 – ELECTRIC BARRIER GATE

- A. The lump sum bid price shall include all work related to furnishing and installing the electric barrier gate and all associated appurtenances at the entrance to the site as depicted on the Contract Drawings, furnishing and installing mounts and housings for two FOB Readers at the barrier gate, and removal and proper disposal of the existing steel entrance gate. Securadyne Systems will furnish, install, connect, and test the field devices associated with the FOB Readers, as identified in Specification Section 01010, Summary of Work. Payment for field devices supplied by Securadyne Systems and coordination and integration with the existing security system is included under Item No. 20 – Stated Allowance: FOB Readers, Equipment, and Integration.

2.11 ITEM No. 11 - SCADA ANTENNA IMPROVEMENTS

- A. The lump sum bid price shall include temporary relocation of the SCADA antenna during tank rehabilitation, reinstallation of SCADA antenna upon completion of tank rehabilitation at existing location and elevation, including furnishing and installing new mounting brackets, Unistrut mounting arm, and accessories for the SCADA antenna, removal and disposal of the existing antenna cable, conduit and support bracket, furnishing and installing new antenna communications cable, RGS conduit, and brackets from the permanent location of the SCADA antenna mounted at the top of the new ladder cage to the existing junction box at ground level, galvanized steel mounting pole,

and power tool cleaning and application of spot coat repairs to the tank at locations where the existing conduit support bracket was removed from the tank. Payment for coordination with and integration with the existing SCADA system by the Town's antenna maintenance personnel is included under Item No. 21 – Stated Allowance: SCADA Integration.

2.12 ITEM No. 12 - ELECTRICAL WORK

- A. The lump sum bid price shall include all electrical work related to furnishing and installing a new circuit breaker, below grade electrical conduits including concrete encasement where noted including excavation, backfill, unsuitable material, sand and gravel, wall penetration(s) in the control building wall for electrical conduit and conduit inside the control building, electric handholes, power supply cables for the FOB Readers and electric barrier gate, and appurtenances. Payment under this item also includes installation only of FOB Reader communication cables supplied by Securadyne Systems within the conduit, and local permits including electrical and trench opening permits. Payment for field devices supplied by Securadyne Systems and coordination and integration with the existing security system is included under Item No. 20 – Stated Allowance: FOB Readers, Equipment, and Integration.

2.13 ITEM No. 13 – CLEARING AND GRUBBING

- A. The lump sum bid price shall include all work related to clearing and grubbing all trees and vegetation within the limit of clearing associated with the 12-foot wide access road and gravel drive turning area, as shown on the Contract Documents.

2.14 ITEM No. 14 – PROCESSED GRAVEL SUBBASE

- A. The per cubic yard unit bid price shall include all work related to furnishing and installing the processed gravel subbase for the 12-foot wide access road and gravel drive turning area.

2.15 ITEM No. 15 - GRAVEL ACCESS ROAD

- A. The per cubic yard unit bid price shall include all work related to furnishing and installing dense graded crushed stone and uniformly grading the access road within the limits of the new 12-foot wide access road as depicted on the Contract Drawings to the proposed elevations specified.

2.16 ITEM No. 16 – GRAVEL DRIVE TURNING AREA

- A. The per cubic yard unit bid price shall include all work related to furnishing and installing dense graded crushed stone and uniformly grading the gravel drive to the proposed elevations specified, between the limit of work and 12-foot wide gravel access road, as depicted on the Contract Drawings.

2.17 ITEM No. 17 - TIMBER GUARDRAIL, RIP RAP, AND APPURTENANCES

- A. The lump sum bid price shall include all work related to furnishing and installing approximately 60 square yards of 6-inch rip rap apron, approximately 55 square yards of 12-inch rip rap slope stabilization, and appurtenances, and approximately 70 linear feet of timber guardrail at locations identified and detailed on the Contract Drawings.

2.18 ITEM No. 18 – LOAM AND SEED

- A. The per square yard unit bid price shall include all work related to furnishing and installing loam and seed ground cover within the limits of the new fence line at the water tank as shown on the Contract Drawings.

2.19 ITEM No. 19 – CRUSHED STONE GROUND COVER

- A. The per cubic yard unit bid price shall include all work related to grading and furnishing and installing  $\frac{3}{4}$ -inch crushed stone ground cover and non-woven filter fabric in the vicinity of the water storage tanks, as shown on the Contract Drawings.

2.20 ITEM No. 20 – STATED ALLOWANCE: FOB READERS, EQUIPMENT AND INTEGRATION

- A. Payment shall be made from the stated allowance in the amount of \$30,000 noted under Item No. 20 in the Bid Form. Payment shall be full compensation for all costs associated with equipment supply, installation, connection and testing, as noted in Specification Section 01010, 3.06, and coordination with Securadyne Systems, as required by the Contract Documents. Contractor shall be reimbursed under this bid item the actual costs associated with Securadyne Systems' work based upon paid invoices submitted in advance, without mark-up.

2.21 ITEM No. 21 – STATED ALLOWANCE: SCADA INTEGRATION

- A. Payment shall be made from the stated allowance in the amount of \$2,500 noted under Item No. 21 in the Bid Form. Payment shall be full compensation for all costs associated with coordination with the Town's antenna maintenance personnel as required by the Contract Documents. Contractor shall be reimbursed under this bid item the actual cost of coordination with the Town's antenna maintenance personnel based upon paid invoices submitted in advance, without mark-up.

PART 3 MEASUREMENT AND PAYMENT FOR ALTERNATE 1

3.01 ITEM No. 1A – PAVE ACCESS ROAD

- A. The per square yard unit bid price shall include all work related to clearing and grubbing the access road entrance from Mary Dunn Road within the limits of the 12-foot wide access road as depicted on the Contract Drawings, and installation of asphalt pavement within the limits of the new access road as depicted on the Contract Drawings to the proposed elevations specified. Costs for processed gravel roadway sub-base shall be carried under Item No. 14.

3.02 ITEM No. 2A – DEDUCT LINE ITEM No. 15 FROM THE BASE BID

- A. The lump sum price for Item No. 2A shall constitute a total price for deduction of Item No. 15 from the Base Bid. Should the Awarding Authority choose to include Alternate 1 in the award of the Contract, Item No. 15 of the Base Bid will be replaced with all Bid Items included under Alternate 1.

END OF SECTION

SECTION 01026

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.

1.02 RELATED WORK

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

1.03 GENERAL

- A. For accounting purposes for the Engineer's convenience and as an aid in determining progress payments and price additions or deductions for Contract modifications, the Contractor shall furnish to the Engineer a schedule of values which shall be approved.
  - 1. The schedule of values shall apportion the total amount of the Contract price(s) for each separate item among the main features or costs that form the completed Work.
  - 2. The price breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, subcontract and overhead costs, as well as profit, and shall cover all work involved for the properly completed item and feature listed.
  - 3. Any amount claimed for subcontracts shall be supported by a similar schedule of values with the total amount shown by this price under the Contract price stated in the bid form.

1.04 SUBMITTALS

- A. Prior to first application for payment, submit a proposed Schedule of Values to the Engineer.
  - 1. Meet with the Engineer and determine additional data, if any, required to be submitted.
  - 2. Secure the Engineer's approval of the Schedule of Values prior to submitting first application for payment.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

## SECTION 01092

### ABBREVIATIONS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Listing of Abbreviations: The listing of abbreviations in this Specification Section represent the Standard Organization named.
- B. Related Work:
  - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
  - 2. All related Specification Sections shall be used in conjunction with this Section.

##### 1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the Standard, except when more stringent requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving bids.

##### 1.03 LISTING OF STANDARD ORGANIZATIONS AND THEIR ABBREVIATIONS

AA	Aluminum Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Institute
ADC	Air Diffusion Council
AGA	American Gas Association
AGCA	Associated General Contractors of America
AHDGA	American Hot Dip Galvanizers Association
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Constructors
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWPA	American Wood Preservers Association

AWS	American Welding Society
AWWA	American Water Works Association
BIA	Brick Institute of America
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
DCAM	Comm. of Massachusetts Division of Capital Asset Management
DEP	Department of Environmental Protection
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Research Association
EJCDC	Engineers Joint Contract Documents Committee
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FM	Factory Mutual
Fed. Spec.	Federal Specification
HI	Hydraulic Institute
IEEE	Institute of Electrical and Electronics Engineers
ISA	Instrument Society of America
ISO	International Standards Organization
MIA	Masonry Institute of America
MIL.	Military Specification
MSBC	Massachusetts State Building Code
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry
NAAMM	National Association of Architectural Metal Manufacturers
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NRCA	National Roofing Contractors Association
NSPC	National Standard Plumbing Code
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PPI	Plastic Pipe Institute
PS	Product Standards of the National Bureau of Standards
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TPI	Truss Plate Institute
UL	Underwriters Laboratories

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01170

CONTROL OF WORK AND MATERIALS

PART 1 GENERAL

1.01 GENERAL OBLIGATIONS OF THE CONTRACTOR

- A. Unless special payment is specifically provided in Section MEASUREMENT AND PAYMENT, all incidental work and expense in connection with the completion of work under the Contract will be considered an obligation of the Contractor and all such costs shall be included in the appropriate items in the Bid Form in connection with which the costs are incurred.
- B. Where discrepancies exist between these specifications and the Town rules, regulations, by-laws or standards, the more stringent requirements govern
- C. The Contractor shall notify DIGSAFE at 888-344-7233 at least 72 hours before digging, trenching, blasting, demolishing, boring, backfilling, grading, landscaping or other earth moving operations in any public ways, rights of way and easements.
- D. No work is allowed during the summer season, between Memorial Day and Labor Day, unless a specific permission is given by the Owner.

1.02 SITE INVESTIGATION

- A. The Contractor shall satisfy himself as to the conditions existing within the project area, the type of equipment required to perform the work, the character, quality and quantity of the subsurface materials to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the Drawings and related Sections of the Specifications. Any failure of the Contractor to acquaint himself with the available information will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Hyannis Water System (HWS) assumes no responsibility for any conclusions or interpretation made by the Contractor on the basis of the information made available by the Hyannis Water System.

1.03 COORDINATION WITH LOCAL AGENCIES

- A. Supply the DPW, Local Police Department, Fire Department, Conservation Commission and the Hyannis Water System with the following information:
  - 1. A list of after-hours telephone numbers by which appropriate Contractor personnel can be contacted in the event of emergencies.
- B. Reimburse, if requested, the Hyannis Water System for the actual cost of the services of Town personnel required during other than regular working hours.
- C. The Contractor will be required to designate a contact person as well as an emergency response crew who can be notified by the Hyannis Water System during Contract related emergencies, 7 days a week, 24 hours a day throughout the length of this Contract. The name



of the designated person with a portable cellular telephone number available 24/7 must be furnished to the Hyannis Water System at the pre-construction meeting. The Contractor must also provide a mobile cellular telephone that will remain at the construction site during the hours of construction.

- D. The contact person shall be required to respond to any Hyannis Water System notification in this regard within one hour of such notice by calling (508)-778-9617 during normal working hours or the Barnstable Police Department (508)-775-0387 after hours. Upon being advised by the Hyannis Water System of the location and nature of the emergency, the Contractor will be required to provide an emergency coordinator or contact at the site within one hour of the initial notification and to mobilize the necessary response crew(s) and have them at the site of the emergency within two hours of the initial notification. In case of the Contractor's failure to respond to the emergency, the Owner reserves a right to employ an alternative contractor to rectify the situation and backcharge the Contractor for this emergency work.

#### 1.04 PUBLIC UTILITIES

- A. Comply with the requirements of the Commonwealth of Massachusetts Statute - Chapter 82, Section 40, for excavations in public and private property. Compliance shall include the following:
  - 1. Notify public utility companies in writing at least 72 hours (excluding Saturdays, Sundays and legal holidays) but not more than 30 days before excavating in areas where underground utility plant (pipes, cables, manholes, etc) exist.
  - 2. Provide the Utility Companies with a schedule of the activities in areas where the utilities exist.
  - 3. Notify utility companies of any damage to their utilities resulting from construction operations.
  - 4. The express approval of the Owner shall be obtained before public water is used. Hydrants shall only be operated under the supervision of the Owner's personnel. The water is to be metered. A meter must be attained from the Hyannis Water System. The Contractor will be responsible for all associated fees and charges for water use.

#### 1.05 PROVISIONS FOR CONTROL OF EROSION

- A. Take sufficient precautions during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens and calcium chloride into the supplies and surface waters. All catch basins within the limits of work shall be protected against the entry of sediment during construction using silt fence and hay bales.
- B. Should the Contractor propose to discharge water from dewatering and drainage operations to a wetland, stream, river, or other surface water resource, the Contractor shall prepare a Stormwater Pollution Prevention Plan and file a National Pollutant Discharge Elimination System (NPDES) Notice of Intent for discharge.
- C. As a minimum, the following shall apply:
  - 1. Staked bales of hay and silt fence shall be provided at points where drainage from the work site leaves the site. Other methods, which reduce the sediment content to an equal or greater degree, may be used as approved by the Hyannis Water System representative.

2. Loaming and seeding or mulching of cross-country areas shall take place as soon after laying of the pipeline as practicable. This shall be considered part of the pipeline work and full payment for the pipeline work may not be made until it has been completed.
- D. Measures for control of erosion shall be adequate to assure that turbidity in the receiving water will not be increased more than 10 standard turbidity units (s.t.u.), or as otherwise required by the State or other controlling authority.
- E. The silt fence and non-biodegradable parts of the hay bales (wires, sock or other fabric, stakes) shall be removed as soon as the construction is completed and accepted, or per request of the Owner.

#### 1.06 DUST CONTROL

- A. Perform dust control operations, in an approved manner, whenever necessary or when directed by the Owner, even though other work on the project may be suspended.
- B. Methods of controlling dust shall meet all air pollutant standards as set forth by Federal and State regulatory agencies. Dust control shall be generally accomplished by the use of water; however, the calcium chloride may be used when necessary to control dust nuisance. Calcium chloride shall conform to AASHTO M144, Type I except the requirements for "total alkali chlorides" and other impurities shall not apply.
- C. Calcium chloride shall be uniformly applied at the rate of 1-1/2 pounds per square yard or at any other rate as required by the Engineer. Application shall be by means of a mechanical spreader, or other approved methods. The number and frequency of applications shall be determined by the Engineer.
- D. Water may be sprinkler applied with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar. Water shall be dispersed through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.

#### 1.07 TRASH AND DEBRIS REMOVAL

- A. Contractor shall maintain a trash receptacle on site. All trash generated during construction shall be collected and periodically removed. The Contractor is responsible to maintain the trench and backfill free of bottles, boxes, caps, plastic bags and other garbage.

#### 1.08 APPROVAL OF MATERIALS

- A. Unless otherwise specified, only new materials and equipment shall be incorporated in the work. All materials and equipment furnished shall be subject to the inspection and approval of the Hyannis Water System representative. No material shall be delivered to the work without prior approval of the shop drawings by the Hyannis Water System representative.
- B. Submit to the Hyannis Water System representative, shop drawings and other data related to materials and equipment proposed to be furnished for the work. Notify the Hyannis Water System representative when the material is delivered to allow inspection to confirm its conformity to approved shop drawings.

- C. Facilities and labor for handling and inspecting all materials and equipment shall be furnished by the Contractor. If the Hyannis Water System representative requires, either prior to beginning or during the progress of the work, submit additional samples or materials for such special tests as may be necessary to demonstrate that they conform to the requirements specified herein. Except as otherwise noted, the Hyannis Water System will make arrangements for and pay for the tests.

#### 1.09 HANDLING AND STORAGE OF MATERIALS

- A. The Contractor is fully responsible for safety, security and protection of any stored materials and equipment. Contractor is also responsible for cleanup after using Town property. The Town is not responsible for any damage or losses of Contractor's materials.
- B. All materials which, in the opinion of the Hyannis Water System representative, have become damaged shall be promptly removed from the site of the work and no compensation shall be given for the damaged material or its removal and replacement.
- C. All pipe and other materials delivered to the job shall be unloaded and placed in a manner which will not hamper the normal operation of the existing facilities or interfere with the flow of necessary traffic.

#### 1.10 PUBLIC SAFETY

- A. When, in the opinion of the Barnstable Police Department public safety or convenience requires the services of police, the Contractor shall make arrangements with the Police department to obtain necessary Details.
- B. The intent is to insure public safety by police direction of traffic. Police are not to serve as watchmen to protect the Contractor's equipment and materials, or to warn pedestrians of such hazards as open trenches. Nothing contained herein shall be construed as relieving the Contractor of any of his/her responsibilities for protection of persons and property under the terms of the Contract.
- C. Payments to police under this Contract shall be made by the Hyannis Water, unless otherwise determined, or in case of no-show of the contractor without proper cancellation of the police detail.
- D. Cancellation of any scheduled police detail due to inclement weather or any other reason shall be the responsibility of the Contractor and shall be made no less than 1 hour prior to the scheduled start time. Contractor shall be responsible for payment of police details not cancelled or cancelled without proper 1 hour notice.

#### 1.11 TRAFFIC CONTROL

- A. The Contractor shall furnish and install all construction signs, warning signs, barricades and other devices, 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.

- 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.

#### 1.12 TRAFFIC OFFICERS AND RESIDENT INSPECTORS

- A. The Contractor is responsible for scheduling the Uniformed Traffic Police Officers and Resident inspectors.
- B. Unless otherwise arranged, all costs associated with the Uniformed Traffic Police Officers and Resident Inspectors shall be paid for by the Town, except any costs arising out of untimely cancellation of the Officers/Inspectors and/or failure of the contractor to attend the work while the Officers/Inspectors are scheduled. In these cases the Traffic Officers and/or Resident Inspectors cost shall be borne by the Contractor.

#### 1.13 ENVIRONMENTAL PROTECTION

- A. The environmental requirements apply to cross-country areas, river and stream crossings, construction in and adjacent to wetlands, drainage facilities, culverts, etc. unless otherwise specifically stated.
- B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of erosion control socks around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.
- C. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

#### 1.14 PROTECTION OF LANDSCAPE:

- A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without permission from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.
- B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is an injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint.
- C. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and

maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

#### 1.15 MATERIAL REMOVAL AND DISPOSAL

- A. The Contractor shall, at no additional costs to the Hyannis Water System, preserve, remove and deliver to the Hyannis Water System yard all materials and equipment that Hyannis Water System representative considers salvageable and/or re-usable. The location of the yard shall be indicated by Hyannis Water System representative.
- B. All other materials to be removed shall be legally disposed off at no additional costs to the Hyannis Water System.

#### 1.16 WORK OUTSIDE NORMAL HOURS

- A. In case when interruption of water service create considerable problem for customers, such as medical and dental offices, hotels and shelters, etc, the Contractor will be permitted to work outside normal hours. This work shall be coordinated with the Town Fire, Police and DPW administration and therefore planned in advance. The Contractor to notify Hyannis Water System representative two (2) weeks prior any work planned to be performed over night or during weekends.

#### 1.17 CLEANUP WORK

- A. 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.
- B. 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.
- C. 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. 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.
- D. 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.
- E. 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.

- F. Before acceptance by the Owner, the Contractor shall perform a final cleanup to bring the construction site to its original or specified condition. This cleanup shall include removing all trash and debris off the premises. Before acceptance, the Engineer shall approve the condition of the site.

END OF SECTION

## SECTION 01200

### PROJECT MEETINGS

#### PART 1 GENERAL

##### 1.1 PRECONSTRUCTION CONFERENCE

- A. A pre-construction conference will be held between the Contractor, Hyannis Water System and applicable agency representatives to review the Contractor's proposed methods of complying with the requirements of the Contract Documents.
- B. Contractor will be notified of the time, date and place where the pre-construction conference will be held.
- C. The contractor shall submit on or before the pre-construction conference the following:
  - 1. Proposed construction schedule
  - 2. Schedule of Values, formatted as AIA Document G703
  - 3. Shop Drawings in accordance with Specification Section 01300

##### 1.2 PROGRESS MEETINGS

- A. In addition to other regular project meetings for other purposes (as indicated elsewhere in the Contract Documents), hold general progress meetings EVERY TWO WEEKS, unless otherwise decided by the Owner. Meeting dates shall be established and coordinated by the Hyannis Water System Representative.
- B. Require every entity then involved in the planning, coordination or performance of work to be properly represented at each meeting. Include (when applicable) consultants, separate contractors (if any), principal subcontractors, suppliers/manufacturers/fabricators, governing authorities, insurers, special supervisory personnel and others with an interest or expertise in the progress of the work. Review each entity's present and future needs including interface requirements, time, sequence, deliveries, access, site utilization, temporary facilities and services, hours of work, hazards and risks, housekeeping, submittals, change orders, and documentation of information for payment requests. Discuss whether each element of current work is ahead of schedule.
- C. Determine how behind-time work will be expedited, and secure commitments from the entities involved in doing so. Discuss whether schedule revisions are required to ensure that current work and subsequent work will be completed within the Contract Time. Review everything of significance which could affect the progress of the work.

- D. Within seven days after each progress meeting date, the HWS Representative will forward copies of the minutes-of-the-meeting, to the Contractor.
- E. Immediately following each progress meeting where revisions to the Construction Schedule have been made or recognized (regardless of whether agreed to by each entity represented), revise the Schedule. Reissue revised Schedule within 10 days after meeting. At intervals matching the preparation of payment requests, revise and reissue the Schedule to show actual progress of the work in relation to the latest revision of the Schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



## SECTION 01300

### SUBMITTALS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION OF REQUIREMENTS

- A. This Section specifies the general methods and requirements of submissions applicable to Shop Drawings, Product Data, Samples, site photographs and videotaping, Construction Schedules, Change Orders and Payment Requisitions, and records. Detailed submittal requirements are specified in the technical Sections.
- B. Submittals shall be clear and legible and of sufficient size for presentation of data.

##### 1.02 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

- A. Shop Drawings
  - 1. Shop drawings as specified in individual Sections include, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the work.
  - 2. All shop drawings submitted by subcontractors shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time.
  - 3. All details on shop drawings shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted.
- B. Product Data
  - 1. Submit product data as specified in individual Sections.

##### 1.03 CONTRACTOR'S RESPONSIBILITIES REGARDING SHOP DRAWINGS

- A. Review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:
  - 1. Field measurements
  - 2. Field construction criteria
  - 3. Catalog numbers and similar data
  - 4. Conformance with related Sections
- B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "By this submittal, I hereby represent that I have determined and verified

all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package.

- C. Notify the Hyannis Water System in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.
- D. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished, which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Hyannis Water System will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
- E. Project work, materials, fabrication, and installation shall be in conformance with approved shop drawings, applicable samples, and product data.
- F. Number of submittals required: three (3) copies.
- G. Submittals shall contain, as necessary:
  - 1. The date of submission and the dates of any previous submissions.
  - 2. The Project title and number/ Contractor identification.
  - 3. Contractor's stamp.
  - 4. The names of Contractor, Supplier, Manufacturer.
  - 5. Identification of the product, with the section number, page and paragraph(s).
  - 6. Field dimensions, clearly identified as such.
  - 7. Relation to adjacent or critical features of the work or materials.
  - 8. Applicable standards, such as ASTM or Federal Standards numbers.
  - 9. Identification of deviations from Contract Documents.
  - 10. Identification of revisions on resubmittals.
  - 11. An 8-in by 3-in blank space for approval Engineer stamp.
  - 12. Where calculations are required to be submitted by the Contractor, the calculations shall have been checked by a qualified individual other than the preparer. The submitted calculations shall clearly show the names of the preparer and of the checker.

#### 1.04 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

- A. The review of shop drawings, data and samples will be for general conformance with the design concept, Contract Documents and Hyannis Water System specifications. They shall not be construed:
  - 1. as permitting any departure from the Contract requirements;
  - 2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.
- B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- C. Submittals will be returned to the Contractor under one of the following codes.
- Code 1 - "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
- Code 2 - "APPROVED AS NOTED." This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
- Code 3 - "RESUBMIT." This code is assigned when notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Hyannis Water System within 15 calendar days of the date of the Hyannis Water System's transmittal requiring the resubmittal.
- D. Re-submittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall identify all revisions made to the submittals, either in writing on the letter of transmittal or on the shop drawings by use of revision triangles or other similar methods. The resubmittal shall clearly respond to each comment made by the Hyannis Water System on the previous submission. Additionally, the Contractor shall direct specific attention to any revisions made other than the corrections requested by the Hyannis Water System on previous submissions.
- E. Partial submittals may not be reviewed. Submittals not complete will be returned to the Contractor and will be considered "Not Approved" until resubmitted. The Hyannis Water System may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.
- F. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Hyannis Water System at least 7 working days prior to release for manufacture.
- G. When the shop drawings have been completed to the satisfaction of the Hyannis Water System, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Hyannis Water System.

1.05 CONSTRUCTION SCHEDULE AND SCHEDULE OF VALUES

- A. Before the beginning of construction, provide overall and complete schedule of work and the schedule of values using the bid form format.
- B. The construction schedule shall include all necessary activities, as well as allowance for interruptions of construction due to bad weather.
- C. Provide all schedules required by the General Conditions.
- D. No construction activity will be allowed before these Schedules are approved by the Owner.

1.06 CHANGE ORDERS

- A. Submit preliminary Change Order estimate before actual work is performed.
- B. No work under Change Order shall be performed until the Change Order is approved.
- C. Payment of all change orders shall be in accordance with the relevant provisions of MGL Chapter 30, Section 39G for non-building construction and Section 39K for building construction. Payment of change orders shall be made:
  - 1. In accordance with prices as set forth in the contract;
  - 2. Agreed upon lump sum or unit prices;
  - 3. Time and materials.
- D. The Change Order application shall include:
  - 1. Change Order number;
  - 2. Project/Contract number;
  - 3. Date of Change order;
  - 4. Contract Amount (as Bid);
  - 5. Net Change of Contract Price (this change order);
  - 6. Extended Completion date (is applicable).

1.07 APPLICATION FOR PAYMENT

- A. The Request for payment shall be submitted in form of AIA Document G702 format.
- B. The Application and Certificate for Payment shall be signed and notarized.
- C. Submit at least three (3) original copies of Application and Certificate for Payment. One copy will be returned back to the Contractor and two will remain in the Hyannis Water System file.
- D. The Application shall be accompanied with monthly payroll report forms, in accordance with Massachusetts General Law.
- E. The Contractor shall submit all forms and information required by DEP for SRF program as applicable.

PART 2 MATERIALS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01385

PRE-CONSTRUCTION VIDEO RECORDING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work included: The Contractor shall provide all labor, materials, tools and equipment necessary to furnish a video recording of the site prior to the start of the work.

1.02 RELATED WORK

- A. Documents affecting the work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and all Divisions of these Specifications.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 VIDEO RECORDING

- A. Equipment
  - 1. The equipment employed in the video recording shall be sufficient to provide a clear, full color and detailed visual description of the site along with a detailed narrative description of physical conditions and location.
- B. Area Included
  - 1. The area included in the video recording shall include the actual location of the work, the adjacent property and all other areas which could reasonably be anticipated to be affected by the work.
  - 2. Particular attention should be paid to the existing condition of private property immediately adjacent to the work.
- C. Documentation
  - 1. The video recordings shall be conducted at a slow walking pace and shall record the physical conditions in the area described above.
  - 2. The narrative description shall be recorded simultaneously and shall supplement the visual description particularly with regard to location.
  - 3. Contractor shall furnish three (3) complete copies of the video recording to the Engineer prior to the start of the work.

D. Personnel

1. All personnel employed by the Contractor in video recording shall be experienced in all aspects of the process, including recognition of important physical conditions in and around the site of the Work.

END OF SECTION

SECTION 01505

MOBILIZATION

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Includes: The transportation and storage of all equipment and materials necessary to the Work and the field offices.
- B. RELATED WORK
  - 1. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 0 thru Division 16 of these Specifications.

PART 2 MATERIALS (Not Applicable)

PART 3 EXECUTION

3.01 STORAGE AREA

- A. It shall be the Contractor's sole responsibility to procure and maintain a suitable storage area for tools, materials, and equipment necessary to perform the work.
  - 1. The storage area obtained by the Contractor shall not obstruct or interfere with pedestrian or vehicular movement, and shall not occupy any space within the public right-of-way, except with specific permission from the Owner.
  - 2. The storage area shall be kept neat at all times.
  - 3. The Owner shall not be a party to negotiations related to acquisition of areas for storage or cleanup of the same (unless the storage area is on Owner's property), but reserves the right to inspect such area(s) for compliance with Owner regulatory requirements.
  - 4. Contractor shall not use storage area for bulk storage of hazardous materials (e.g., gasoline, solvents, oil).

3.02 EQUIPMENT

- A. Contractor shall transport all equipment to the site, assemble the equipment as needed to proceed with the work and maintain the equipment as needed during the work.

END OF SECTION



SECTION 01510

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 DESCRIPTION

- A. The work of this Section shall consist of providing the following temporary facilities:
1. Water,
  2. Sanitary Facilities.

PART 2 PRODUCTS

2.01 TEMPORARY WATER

- A. Drinking water shall be provided by the Contractor for his personnel and the personnel of his sub-contractors.
1. Drinking water shall be tested and approved by the State Agency as "safe drinking water suitable for human consumption."
  2. Owner shall furnish water for construction, free of charge to the Contractor.

2.02 TEMPORARY SANITARY FACILITIES

- A. 1. Sanitary conveniences, properly screened from public observation, for the use of all persons employed on the work and beginning with the first man engaged in preliminary operations, shall be provided and maintained by the Contractor in sufficient numbers through the completion of the work.
2. Contractor shall be diligent in maintaining sanitary facilities; pumping weekly, or more often as required to protect soil and water quality.

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01610

PRODUCT HANDLING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work included: Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

1.02 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.03 MANUFACTURER'S RECOMMENDATIONS

- A. Comply with manufacturers' recommendations on product handling, storage, and protection.

1.04 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container(s), with labels intact and legible.
  - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
  - 2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality and other pertinent information.

1.05 PROTECTION

- A. Mechanical equipment subject to damage by the atmosphere if stored outdoors, shall be stored in a building with a controlled environment. The building may be a temporary structure on the site or a building off the site.
- B. PVC pipe shall be covered to protect it from UV degradation.

1.06 REPAIRS AND REPLACEMENTS

- A. In event of damage, promptly make replacements and repairs to the approval of the Engineer at no additional cost to the Owner.

- B. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify an extension in the Contract Time of Completion.

END OF SECTION

SECTION 01620

PROJECT SIGNS

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes the following:
  - 1. Furnish, install, and maintain one project sign.
  - 2. Furnish, install, and maintain DEP project file number signs, if applicable.
  - 3. Remove signs on completion of construction.
  - 4. Allow no other signs to be displayed.
- B. Wood signs as specified in this section shall be prepared and installed. The signs shall be in accordance with Town of Barnstable By-laws. Sign location to be coordinated with the Owner.
- C. Contractor shall apply and pay for all required permits to allow installation of project signs.

1.02 DESCRIPTION

- A. 3 ft. by 6 ft. project sign shall be displayed at the construction site at the access road entrance. The sign shall have a white background with blue lettering. The sign shall indicate the following:

**Owner's Name:**                      **Town of Barnstable, MA**  
**Water Supply Division**  
**Hyannis Water System**

**Town Seal**

**Project:**                              **Mary Dunn No. 1 Water Storage Tank**  
**Rehabilitation**

**We are working to improve your water quality!**

**For more information contact: Department of Public Works,**  
**Water Supply Division, Hyannis Water System - (508)-775-0063**

1.03 SUBMITTALS

- A. Submit project sign layout for Owner's approval in accordance with Specification Section 01300 and as specified herein.

1.04 QUALITY ASSURANCE

- A. Finishes, Painting: Project sign shall resist weathering and fading for the duration of the construction period.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Wood Exterior Paint
  - 1. Sherwin-Williams or approved equal.

### 2.02 MATERIALS

- A. Project Sign Materials
  - 1. Structure and Framing: May be new or used, wood in sound condition, structurally adequate to work, and suitable for specified finish.
  - 2. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints:
    - a. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.
  - 3. Wrought Hardware: Galvanized.
  - 4. Alkyd Gloss Paint System:
    - a. Give priming coat (2.5 mil thick) to entire woodwork of sign.
    - b. Give two (2) (1.5 mil) coats of white exterior Alkyd Gloss paint to sign including framework.
  - 5. Sign shall be a minimum size of 36 inches by 72 inches. Uppercase lettering shall be 2.5" high by 1.5" wide. Lowercase lettering shall be 2.0" high by 1.5" wide, unless otherwise agreed upon.
  - 6. Sign shall be weather resistant material.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Wood surface shall be clean and dry. Paint exposed surface of supports, framing, and surface material; one coat of primer and two coats of exterior paint as indicated herein.
- B. Paint graphics in styles, sizes, and colors selected.

### 3.02 ERECTION

- A. Erect project sign at location selected by Owner.
- B. Remove sign, framing, supports, and foundations at completion of project and deliver to the Owner.

### 3.03 MAINTENANCE

- A. Maintain sign and supports in a neat, clean condition; repair damages to structure sign within one week, if damaged.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 DESCRIPTION

- A. The work of this Section consists of procedures and requirements for contract closeout, such as cleaning, restoration of project site to original condition, inspections, and guarantees.

PART 2 MATERIALS (Not Applicable)

PART 3 EXECUTION

3.01 CLEANING UP

- A. During its progress, the work and the adjacent areas affected thereby shall be kept cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.
- B. Where material or debris has washed or flowed into or been placed in water-courses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations, such material or debris shall be entirely removed and legally disposed of during progress of the work, and the ditches, channels, drains, etc., kept in a neat, clean and functioning condition.
- C. On or before the completion of the work, the Contractor shall, unless otherwise especially directed or permitted in writing, remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operation in a neat and satisfactory condition.
- D. Unless otherwise specifically directed or permitted in writing, the Contractor shall perform the following tasks:
  - 1. Tear down and remove all temporary buildings and structures built by him.
  - 2. Remove all temporary works, tools, and machinery or other construction equipment furnished by him.
  - 3. Remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him.
    - a. Subsequent to disinfection, remove or suitably neutralize disinfectant residuals from treated area(s).
  - 4. Remove all rubbish from any grounds which he has occupied.

5. Leave roads and all parts of premises and adjacent property affected by his operations in a neat and satisfactory condition.

### 3.02 RESTORATION

- A. The Contractor shall restore or replace, when and as directed by the Engineer, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations.
  1. To this end, the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work.
  2. Suitable materials, equipment, and methods shall be used for such restoration, or as required in other divisions of this Specification.
- B. In restoring the disturbed areas the Contractor shall:
  1. Replace to an equivalent depth any loam that has been removed during the excavation.
  2. Remove from the property and legally dispose of in an approved fashion all trees, brush, and other items that the Contractor has cut in order to prosecute his work.
  3. Remove from the property upon completion of the work thereon, all excess materials of construction such as stone, pipe, concrete block, gravel, etc., that the Contractor may have stockpiled for use during the course of the work.
  4. Leave the land in a smooth, even condition. All ruts, holes or other undesirable grading conditions which resulted from work under this Contract shall be filled and the area so graded to eliminate ponding.
  5. All drainage course(s) shall be restored to their pre-existing condition or better.
  6. Reset all public or private monuments, iron pipes or other types of property line and geodetic markers damaged or disturbed by operations under this Contract. This work shall be done by a licensed land surveyor at no additional cost.
  7. Repair, reset or replace as directed all pipes, walls, utilities, fences, railings, stone walls, etc., and ornamental or utilitarian domestic accessories, such as, but not limited to, arbors, fireplaces, sheds and incinerators, or other surfaces, structures, or property which may have been damaged, either directly or indirectly by his operations under this Contract.
  8. Restore to a condition at least equal to that in which they were found immediately prior to the beginning of construction all sidewalks, gutters, driveways and curbs which have been damaged by the Contractor's operations.

### 3.03 FINAL INSPECTION

- A. At completion of all work, the Owner and Engineer, along with the General Contractor and each of the subcontractors shall conduct a final inspection jointly for "punch list" purposes and to determine the exact status of the project before final acceptance.

### 3.04 GUARANTEES

- A. The Contractor shall take notice of special guarantees required in the technical Sections of these Specifications.

1. If, in the opinion of the Owner, any item requires excessive maintenance during guarantee periods, the item shall be considered defective and the Contractor shall correct the defects.
2. All defects so corrected shall be at the expense of the Contractor.

END OF SECTION



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DIVISION 2 GENERAL REQUIREMENTS

SECTION	SUBJECT	PAGES
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02222	Earthwork	02222-1 thru 02222-10
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## SECTION 02070

### SELECTIVE DEMOLITION

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Work included: Demolition of existing wooden roof, support structure and center rigging post assembly, as indicated on the Drawings as required by the Contract Documents.
- B. In general, work under this Section includes providing all labor, equipment and materials necessary to remove and properly dispose of items as outlined in Section 01010 Summary of Work, and the Contract Drawings.
- C. The Contractor shall coordinate his work on the Mary Dunn No. 1 Water Storage Tank with the Barnstable Department of Public Works in sufficient time so that the tank can be drained as far down as possible prior to start of any demolition work. No demolition shall take place without the approval of Owner and Engineer. Tank shall remain in service until September 15, 2017, and shall be back in service by November 15, 2017.
- D. Selective demolition work generally consists of, but is not limited to the following:
  - 1. Removal of existing raised wooden tank roof and appurtenances, existing ladder, cage, safety climb device, and fence sections.

##### 1.02 RELATED WORK

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
  - 1. Section 05520 Aluminum Dome Roof

##### 1.03 DEFINITIONS

- A. Remove: Remove and legally dispose of items indicated.
- B. Remove and Replace: Remove and legally dispose of items indicated to be removed and replaced. Install new items in the same locations or in locations indicated.
- C. Remove and Relocate: Remove items indicated; install the items in the locations indicated.
- D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Engineer, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

#### 1.04 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

#### 1.05 SUBMITTALS

- A. Shop drawings and product data in accordance with Section 01300.
- B. Schedule of selective demolition activities indicating the following:
  - 1. Detailed sequence of selective demolition and removal work, including starting and ending dates for each activity.
  - 2. Interruption of utility services.
  - 4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
  - 5. Coordination of Owner's continuing occupancy of portions of existing structures and utilities and of Owner's partial occupancy of completed Work.
- C. Inventory of items to be removed and salvaged.
- D. Inventory of items to be removed by Owner.
- E. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations. Photographs shall be in digital format.
- F. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

#### 1.06 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Contractor must be experienced and successfully completed selective demolition work similar to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing local, state, and federal notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

#### 1.07 PROJECT CONDITIONS

- A. Owner may occupy portions of the site immediately adjacent to selective demolition area. Conduct selective demolition so that Owner's operations will not be disrupted. Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.

- B. Owner assumes no responsibility for actual condition of buildings to be selectively demolished.
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Hazardous Materials:
  - 1. The Contractor shall conduct necessary investigation, prepare the Health and Safety Plan and submit to the Engineer for review.
  - 2. All work associated with testing, removal, containment, and disposal of hazardous materials shall be in accordance with all applicable local, State, and Federal regulations.
- D. Storage or sale of removed items or materials on-site will not be permitted.

## PART 2 PRODUCTS (Not Applicable)

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. The Contractor must receive written authorization from the Engineer and/or Owner to begin any work under this Section.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required. Investigate presence of the hazardous materials, prepare and submit Health and Safety Plan.
- C. Inventory and record the condition of items to be removed and reinstalled, or salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Engineer.
- E. Survey the condition of the tank to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.
- F. Perform surveys as work progresses to detect hazards resulting from selective demolition activities.

### 3.02 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction.

- Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
2. Provide not less than 72 hours notice to Owner if shutdown of service is required during changeover.
- B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving building to be selectively demolished.
1. Contractor shall arrange to shut off indicated utilities with applicable utility companies.
  2. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
  3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.
- C. Utility Requirements: Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

### 3.03 PREPARATION

- A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
  2. Protect existing site improvements, appurtenances, and landscaping to remain.
  3. Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.
  4. Cover and protect equipment and structures that have not been removed.
- D. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of building to be selectively demolished. Strengthen or add new supports when required during progress of selective demolition.

### 3.04 POLLUTION CONTROLS

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
  - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Remove and transport debris in manner that will prevent spillage on adjacent surfaces.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

### 3.05 SELECTIVE DEMOLITION

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition work above each floor or tier before disturbing supporting members on lower levels.
  - 2. Neatly cut openings and holes plumb, square, and true to dimensions. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering. Temporarily cover openings to remain.
  - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 5. Maintain adequate ventilation when using cutting torches.
  - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - 8. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 9. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
  - 10. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
- B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.

C. Break up and remove concrete slabs on grade, unless otherwise shown to remain.

3.06 PATCHING AND REPAIRS

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

3.07 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn demolished materials.

C. Salvage: All materials and equipment designated to remain under Owner's jurisdiction shall be stored and delivered to the Owner's yard per Owner's request at no cost to the Owner.

D. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.08 CLEANING

A. Clean adjacent existing structures and restore to original condition on completion of selective demolition operation.

END OF SECTION

## SECTION 02110

### CLEARING AND GRUBBING

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Work included: Clear and grub the project site to the limits required by the Contract Documents.

##### 1.02 RELATED WORK

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

##### 1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
  - 1. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

##### 1.04 COORDINATION

- A. Coordinate clearing and grubbing with Owner.

#### PART 2 PRODUCTS ( Not Applicable)

#### PART 3 EXECUTION

##### 3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. Flag limits of clearing.

##### 3.02 PROTECTION

- A. Only trees and brush within the limits of the project site shall be cleared.
  - 1. Protect trees and shrubs, where indicated to remain, by providing a fence around the tree or shrub at its drip line and of sufficient height so trees and shrubs will not be damaged.
  - 2. All areas not designated to be cleared shall be protected from damage.



3. Clearing operations shall be conducted so that cut trees are felled and existing trees designated to remain are protected from damage.
4. Protect control points, benchmarks and existing work.
5. Maintain access to the site at all times.

### 3.03 CLEARING AND GRUBBING

- A. Within the area to be cleared:
  1. Fell trees and brush.
  2. Chip all wood and waste.
  3. Remove all stumps.
  4. Grub out all roots 1 inch in diameter and larger to a depth of at least 12 inches below the existing ground surface.

### 3.04 CONSERVATION OF TOPSOIL

- A. After the area has been cleared of vegetation, strip the existing top-soil.
  1. Stockpile in an area clear of new construction.
  2. Maintain the stockpile in a manner which will not obstruct the natural flow of drainage.
    - a. Maintain stockpile free from debris and trash.
    - b. Keep top-soil damp to prevent dust.
    - c. Place erosion control measures around stockpile.

### 3.05 REMOVAL AND DISPOSAL

- A. All debris, trees, shrubs, brush, roots, stumps and etc. cleared and grubbed from the site shall be removed from the site and disposed of in accordance with all local and Commonwealth of Massachusetts Regulations.
  1. Burning and/or burial of cleared and grubbed material on the site shall not be permitted.
  2. Depressions remaining from the removal of stumps shall be filled with gravel borrow and/or loam, whichever is appropriate to the existing ground surface.

### 3.06 UTILITIES

- A. Protect existing utilities indicated or made known.
  1. Coordinate with utility companies and agencies as required.

END OF SECTION

SECTION 02222

EARTHWORK

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Included: Provide all earthwork as required by the Contract Documents.
- B. In general the work of this Section shall include but not necessarily be limited to, excavation, trenching, filling, backfilling, compaction and grading for water distribution systems.

1.02 RELATED WORK

- A. Documents affecting the work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
  - 1. Section 01300 Submittals
  - 2. Section 02930 Loam and Seed
  - 3. Section 16110 Raceway

1.03 SITE INVESTIGATION

- A. The grades and other site information have been compiled by field surveys.
  - 1. The Contractor acknowledges that he has satisfied himself as to the nature and location of the work.
  - 2. Failure by the Contractor to acquaint himself with all available information concerning the site will not relieve him from the responsibility, for estimating properly, the difficulty or cost of successfully performing the work.

1.04 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
  - 1. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

1.05 PROTECTION OF PROPERTY AND UTILITIES

- A. Extreme care shall be exercised to prevent damage to existing trees, shrubs, utilities, walls, sidewalks, fences and private property.
  - 1. Any damage to these items as a result of work performed by the Contractor shall be repaired by the Contractor at his own expense.
  - 2. Existing property boundary markers, control points and datum elevation markers or bench marks shall be preserved.
    - a. All such items which are displaced or destroyed by the Contractor shall be replaced by a registered Engineer or Land Surveyor, as required, with all expenses paid by the Contractor.

- B. Utility agencies shall be contacted and advised of proposed work prior to the start of work by the Contractor.
  - 1. Notify Dig Safe.
  - 2. Obtain information from the proper sources and authorities concerning locations of all utilities within the scope of this work.
  - 3. If and when encountered, utilities shall be supported and protected, and the Engineer shall be notified.
    - a. Ample time shall be allowed for entrance and taking such measures as may be required for the continuance of such services by the utility owner.
  - 4. Rules and regulations governing the respective utilities shall be observed. The Contractor's responsibilities with respect to utility locations, protection, interferences and relocations shall be as further specified in Section 01170.

#### 1.06 REFERENCE STANDARDS

- A. The Contractor shall comply with the provisions of the following agencies as they apply to this project.
  - 1. Associated General Contractors of America, Inc. (AGCA) "Manual of Accident Prevention in Construction."
  - 2. Occupational Safety and Health Administration, United States Department of Labor Requirements
  - 3. ANSI "Safety Regulations for Construction and Demolition".
  - 4. American Society for Testing & Materials (ASTM)
  - 5. American Water Works Association Standards

#### 1.07 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. Testing and Samples:
  - 1. Test reports on backfill materials, moisture density tests, in place density tests (ASTM D 1557 and D 1556).
  - 2. Representative backfill and bedding samples and gradation tests (ASTM D 422).
  - 3. Tests shall be in conformance with paragraph 3.16; compaction requirements and testing as specified herein.

### PART 2 PRODUCTS

#### 2.01 GENERAL

- A. Except as specified for pipe bedding, pipe cover, roadway subbase, and refill for rock and unsuitable materials, backfill materials may be as follows:
  - 1. Suitable materials for trench backfill shall be the material excavated during the course of construction, but excluding debris, pieces of pavement, frozen materials, organic matter, silt, top soil, ledge excavation and rocks over six inches in largest dimension.
  - 2. Gradation of material shall be generally as specified for gravel borrow except that maximum size of stone shall be 6 inches.
  - 3. The suitability of existing material for use as backfill will be determined by the Engineer.
  - 4. All unsuitable materials shall be disposed of as per paragraph 3.18 A.

2.02 PIPE BEDDING AND COVER MATERIAL

A. Electrical Conduits:

1. Gravel borrow shall be a granular material, well graded from fine to coarse, with gradation as specified in paragraph 2.04 of this specification section, obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted.
2. It shall not contain vegetation, masses of roots, or individual roots.
3. It shall be free from loam and other organic matter, clay, and other fine or harmful substances.
4. Gravel borrow shall conform to requirements as specified in paragraph 2.04 herein.

2.03 CONCRETE SAND

- A. Concrete sand shall meet ASTM C-33 for fine aggregate.

2.04 GRAVEL BORROW

- A. Gravel borrow shall be a granular material, well graded from fine to coarse, with a maximum size of 3 inches, obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted.
1. It shall not contain vegetation, masses of roots, or individual roots.
  2. It shall be substantially free from loam and other organic matter, clay, and other fine or harmful substances.
  3. Gravel borrow shall have the following gradation:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3 inch	95-100
1/2 inch	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-8

2.05 DENSE GRADED CRUSHED STONE (Access Road and Gravel Drive)

- A. Dense graded crushed stone and process gravel subbase shall consist of crusher-run coarse aggregates of crushed stone or gravel and fine aggregates of natural sand or stone screenings uniformly premixed.
1. Coarse aggregate shall consist of hard, durable particles of fragments of stone. The percentage of wear by the Los Angeles test shall not be more than 45.
  2. Fine aggregate shall consist of natural or crushed sand.
- B. Dense graded crushed stone material shall meet the requirements for MassDOT, latest edition, Item M2.01.7. The composite material shall be free from clay, loam or plastic material, and shall meet the following gradation requirements:

**Dense Graded Crushed Stone (Item M2.01.7)**

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
2 inch	100
1 1/2 inch	70-100
3/4 inch	50-85
No. 4	30-55
No. 50	8-24
No. 200	3-10

- C. The processed gravel subbase material used below the dense graded crushed stone shall comply with MassDOT, latest edition, Item M1.03.1, as specified above. The composite material shall be free from clay, loam or plastic material.

**2.06 PROCESSED GRAVEL FOR ROADWAY BASE**

- A. Shall meet the requirements of the Commonwealth of Massachusetts Department of Public Works Standard Specifications for Highways and Bridges, latest edition, M1.03.1.

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3 inch	100
1 1/2 inch	70-100
1/4 inch	50-85
No. 4	30-60
No. 200	0-10

**2.07 3/4-INCH CRUSHED STONE**

- A. Crushed Stone: shall consist of hard, durable processed 3/4-inch crushed stone that meets the requirements for MassDOT, Item M2.01.4, Crushed Stone reproduced from the Massachusetts Standard Specifications for Highways and Bridges, latest edition.
1. Crushed stone shall meet the following gradation requirements:

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

**2.08 6-INCH RIP RAP**

- A. Where shown on the Drawings or ordered by the Engineer riprap shall be modified rockfill in accordance with M2.02.4.
- B. Modified rockfill shall consist of hard, durable angular shaped stones which are the product of the primary crushing of a stone crusher. Rounded stone, boulders, sandstone and similar soft stone or relatively thin slabs will not be acceptable.

- C. Stone shall be free from overburden, spoil, shale, organic material and meet the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
8-inch	95-100
4-inch	0-25
2.5-inch	0-5

2.09 12-INCH RIP RAP

- A. Where shown on the Drawings or ordered by the Engineer riprap shall be modified rockfill in accordance with M2.02.4.
- B. Modified rockfill shall consist of hard, durable angular shaped stones which are the product of the primary crushing of a stone crusher. Rounded stone, boulders, sandstone and similar soft stone or relatively thin slabs will not be acceptable.
- C. Stone shall be free from overburden, spoil, shale, organic material.

2.10 GEOTEXTILE FABRIC

- A. Provide the following nonwoven geotextile fabric:
1. Geotex 501 as manufactured by Propex.
  2. Mirafi 160N as manufactured by TenCate Geosynthetics.
  3. 150 EX as manufactured by Thrace – LINQ, or acceptable equivalent product.
- B. Geotextile fabric shall conform to test requirements for minimum average roll value (weakest principle direction) for strength properties of any individual roll tested from manufacturing lot or lots of particular shipment in excess of minimum average roll value (weakest principle direction) as specified hereafter:
- C. Physical Properties of Minimum Average Roll of the nonwoven geotextile fabric shall be:

<u>Property</u>	<u>ASTM Test Method</u>	<u>Units</u>	<u>Value</u>
1. Grab Strength	D4632	lbs	150 (min.)
2. Grab Elongation	D4632	%	50 (min.)
3. Trapezoidal Tear Strength	D4533	lbs	60 (min)
4. Puncture Strength	D4833	lbs	75 (min.)
5. Permittivity	D4491	sec -1	1.3 (min.)
6. Apparent Opening Size	D4751	Sieve Number	70-100
7. Ultraviolet Stability	D4355	Percent	70 (min.)

## PART 3 EXECUTION

### 3.01 TRENCH EXCAVATION

- A. The Contractor shall make all excavation in earth and in rock, necessary or incidental to the proposed construction under the terms of this Contract and as herein specified or indicated on the Drawings.
1. All trench excavation shall be accomplished by open cut method.
  2. All excavation shall be made in such manner and to such widths as will give ample room for properly installing, constructing and inspecting pipe lines and structures they are to contain.
  3. The width of trenches shall be sufficient to allow thorough compacting of the refill adjacent to the lower quarters of the pipe. At pipe joints such additional width and depth shall be excavated as is necessary to give ample room for properly making and inspecting the pipe joint.
  4. Bracing and support of all trench excavation shall meet all requirements of Local and State ordinances and OSHA regulations.
    - a. Sheeting and bracing, or the use of a steel support box shall be used where required to maintain a safe working condition and provide protection from collapse of the trench walls.
  5. During excavations, material determined by the Engineer to be suitable for backfilling, shall be placed a sufficient distance from the banks of the trench to avoid slides or cave-ins. Unsuitable material shall be disposed of as specified in paragraph 3.18 and replaced with surplus suitable material and gravel borrow to the extent necessary.
  6. Should conditions make it impractical or unsafe to place material along the trench, it shall be hauled and stored at a location provided by the Contractor. When required, it shall be re-handled and used in backfilling the trench. No additional compensation will be made for re-handling this material.
  7. Pipe trenches shall be backfilled as soon as practical after the pipes have been laid, jointed and inspected by the Engineer. The extent of excavation open at any one time shall be no more than 50 linear feet of trench during working hours and no more than 20 linear feet during non-working hours.

### 3.02 EXCAVATION CLASSIFICATION

- A. Earth excavation shall comprise all materials not classified as rock excavation and shall include clay, silt, sand, muck, gravel, hardpan, loose shale, pavement, pavement bases, loose stone in masses and boulders measuring less than one cubic yard in volume.

### 3.03 UNSUITABLE MATERIAL

- A. All pipes and structures are to be laid on a stable foundation. If material at grade is determined to be unsuitable by the Engineer, the Contractor shall excavate a further depth and/or width, and refill with an approved material. Refill material shall be structural fill, gravel borrow or crushed stone as determined by the Engineer.
1. Where fine sand and silt are encountered at the bottom of the trench, it shall be the option of the Engineer to require a 6-inch compacted depth of concrete sand meeting ASTM C-33 for fine aggregate to be installed beneath the pipe bedding to the full width of trench.
  2. Payment width limits shall be the same as specified for trench excavation, unless an additional width of trench is ordered by the Engineer.

3. Any excavation in excess of the amount ordered by the Engineer shall be backfilled and compacted with an approved granular material, at the Contractors expense.

### 3.04 BACKFILLING AND COMPACTING

- A. Backfill shall be placed in uniform layers. Each layer shall be thoroughly compacted by tamping or vibrating with mechanical compacting equipment.
  1. Care shall be taken to compact the backfill materials throughout the full width of the excavation and beneath all pipes and structures.
  2. The backfilling of trenches shall proceed as soon as the laying of the pipe (s) or installation of the structures will allow.
  3. Pipe bedding shall be required below and up to the springline of all pipe.
    - a. Pipe bedding shall be placed to the full width of the trench and to a depth of 6 inches below the bottom of the pipe barrel as indicated on the Drawings.
  4. Pipe bedding shall be placed 12 inches beyond the widths of a utility structure foundation (base) and to a depth of 6 inches below the foundation (base) or as indicated on the Drawings.
  5. After a pipe has been placed and bedded, the trench shall be filled to the centerline of the pipe with pipe bedding and compacted.
    - a. Material under and around the pipe shall be carefully and thoroughly compacted and tamped with approved compacting equipment.
  6. From the centerline of the pipe to a point 12 inches above the top of the pipe, the fill shall be pipe bedding.
- B. Placement of Backfill Above the Pipe Bedding
  1. Above the pipe bedding, backfill shall be suitable material from the excavation or, if ordered by the Engineer, gravel borrow.
    - a. This backfill shall be placed in layers 12 inches deep in loose measure, and each layer shall be thoroughly compacted.
    - b. This backfill shall be placed up to the bottom of materials specified to be placed for surfacing requirements.

### 3.05 TRENCH SIZE

- A. Trenches shall be excavated to the necessary width and depth for proper laying of pipe and placement of concrete and other materials and shall have vertical sides to 12 inches above the pipe.
  1. Widths of trenches shall be as shown on the drawings.
  2. The depth of trench shall be a minimum 6 inches below the pipe barrel, or as shown on the Drawings

### 3.06 STRIPPING TOPSOIL

- A. Topsoil shall be carefully stripped and separately stored to be used again for topsoiling and seeding on off-pavement areas within which excavations are to be made.

### 3.07 EXCAVATION NEAR EXISTING STRUCTURES AND UTILITIES

- A. It is called to the attention of the Contractor that there are utilities and other underground pipes along the course of the work. Information shown on the Drawings as to the location of said utilities and pipes is from the best available sources, but no guarantee is



implied, nor is it to be assumed that such information is accurate or complete. Utility lines shall be crossed in the course of the work.

- B. The Contractor shall exercise special care during his operations to avoid injury to all such underground utilities and structures.
  - 1. When necessary, the Contractor shall cooperate with, and consult with representatives of the Owner and the utility companies in order to avoid damage to the utilities.
  - 2. The Contractor shall arrange for or furnish and erect suitable supports and shoring or other means of protection where required to protect the utilities, all at no additional cost to the Owner.
  - 3. Hand methods of excavating shall be used around buried utilities and is included in the work to be done under this Contract, at no additional cost to the Owner.
  - 4. Interference between the proposed work and existing utilities, relocation of existing utilities, repair or damage to existing utilities, and protection and support of existing utilities during construction of the proposed work will be as specified in Section 01013.

### 3.08 PROTECTION OF PROPERTY

- A. The Contractor shall, at his own expense, preserve and protect from injury all property either public or private along and adjacent to the line of work, and be responsible for and repair any and all damage and injury thereto, arising out of or in consequence of any act or omission of the Contractor.
  - 1. All existing pipes, culverts, poles, wires, fences, mailboxes, stone walls, curbs, bounds, etc., shall be temporarily removed, supported in place or otherwise protected from injury, and shall be restored to at least as good condition as that in which they were found immediately prior to the start of work.
  - 2. Lawns, shrubs, bushes, planting beds and decorative trees disturbed or damaged shall be restored to a condition equal to that found prior to the start of construction, either by temporary transplant or replacement in kind, except as otherwise indicated on the Drawings.

### 3.09 SAFETY AND ACCOMMODATION

- A. The Contractor shall provide, at his own expense, suitable bridges over trenches where required for the accommodation and safety of the traveling public, and provide facilities for access to private driveways for vehicular use.
  - 1. He shall erect suitable barriers around the excavation to prevent accidents to the public and shall place and maintain during the night, sufficient lights on or near the work.
  - 2. A space of twenty (20) feet shall be left so that free access may be had at all times to fire hydrants and proper precautions shall be taken so that the entrances to fire hydrants and fire stations shall not be blocked or obstructed.

### 3.10 UNIFORMED POLICE OFFICERS

- A. The Contractor shall make all arrangements with the local Police Chief and/or the State Police for the services of uniformed police officers.
  - 1. If, in the opinion of the State Police, Police Chief or the Owner, uniformed police officers are required for protection of persons and control of traffic, the Contractor shall be responsible for making all arrangements for said uniformed police officers as may be required.

3.11 COMPACTION REQUIREMENTS AND TESTING

- A. All backfill materials shall be thoroughly compacted by rolling, tamping or vibrating with approved mechanical or pneumatic compacting equipment so that pipe, structures, paving and other construction will not settle at the time of construction or in the future. The responsibility for thorough compaction is that of the Contractor irrespective of methods of backfill and depth of backfill layers placed.
- B. All percentages of compaction specified herein shall be of the maximum dry density at the optimum moisture content as established by Method D of AASHTO Standard T180 (ASTM D1557) (Modified Proctor) and verified by AASHTO Standard T147 (ASTM D 1556). When the term "thoroughly compacted" is used in these specifications, it shall mean compaction to at least 95% of the maximum density of the soils at optimum moisture content.
- C. The following numbers and types of soil tests shall be made where directed by the Engineer. These tests shall be made by qualified personnel of an independent testing laboratory, acceptable to the Engineer and paid by the Contractor. Three copies of all test results shall be delivered to the Engineer.
  - 1. Particle-Size analysis of Soils and Backfill Materials in accordance with ASTM D422. A total of 4 satisfactory tests.
  - 2. Moisture-Density Relationship of soil in accordance with ASTM D1557, Method D. A total of 4 satisfactory tests.
  - 3. In-Place Density Tests of materials in accordance with ASTM D1556. One in-place density test shall be performed every 150 linear feet, or as directed by the Engineer. Compaction tests will be taken at random on compaction layers below and at finished surfaces.
  - 4. Failed tests shall be repeated at the Contractor's expense.
- D. The Owner reserves the right to have additional compaction tests performed by an independent laboratory with testing costs borne by the Owner, except that failed tests shall be repeated at the Contractor's expense.
- E. If any of the field density test results fail to met the density as specified herein for the earthwork involved, then the Contractor shall remove all of the earthwork in that portion of the work involved as determined by the Engineer, and shall replace it in accordance with these Specifications to the required density. After the work is replaced, additional field density tests will be made by an independent testing laboratory retained by the Owner, and the Contractor shall reimburse the Owner for all costs for such additional testing.
  - 1. Compaction shall be to the following densities:

<u>Fill and Backfill Location</u>	<u>Modified Proctor Density (Percent)</u>
Under structures and pipes	95
Beside structure foundation walls	95
Top two feet under pavements	95
Under pavements below top two feet	95
Trenches through unpaved areas	90
In embankment	90

- F. Puddling and jetting of the backfill shall not be permitted except in special cases approved by the Engineer.

### 3.12 TRENCH EXCAVATION IN FILL

- A. Where the existing ground surface does not permit at least 4 feet of cover over the finished pipe, and where indicated on the Drawings, the Contractor shall place and compact suitable fill material to the depth necessary to provide the 4-foot minimum cover, including loam to a minimum top width of 6 feet, or as otherwise shown on the Drawings
  - 1. Minimum side slopes shall be two horizontal to one vertical.
  - 2. Fill material shall be from surplus suitable material or gravel borrow, and be clean, dry, and capable of satisfactory compaction, all as approved by the Engineer, and shall be placed in layers not exceeding 8 inches thick and compacted.
  - 3. The trench shall be excavated in the compacted fill and the remainder of the work shall be in accordance with other portions of these Specifications.

### 3.13 DISPOSAL OF SURPLUS AND UNSUITABLE EXCAVATED MATERIAL

- A. All surplus excavated material and any material unsuitable for use shall be disposed of in disposal areas provided by the Contractor.
  - 1. It is the Contractor's responsibility to dispose of unsuitable excavated material in an approved manner.
  - 2. The Contractor shall not dispose of surplus materials on wetlands or other areas prohibited by the Corps of Engineers or the Commonwealth of Massachusetts Department of Environmental Protection, or any other local authority having jurisdiction.

### 3.14 CLEAN-UP

- A. The Contractor shall remove all surplus materials (earth, pipe, fittings, storage and office trailers, barricades, etc.), from the construction site.
  - 1. All paved roadways affected by the construction shall have their full width swept clean (paved edge to paved edge) using methods which control the dust.
  - 2. Before the Contractor may proceed to another roadway, clean up of the previous roadway must be complete.

END OF SECTION

## SECTION 02444

### VINYL COATED CHAIN LINK FENCE AND GATE

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals necessary and install the vinyl coated chain link fence and gates as shown on the drawings and/or as specified herein.
- B. Unless otherwise directed, the entire perimeter of the site shall be completely fenced.

##### 1.02 SUBMITTALS

- A. Comply with pertinent provision of Section 01300.
- B. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Materials list of items proposed to be provide under this Section.
  - 2. Manufacturer's specifications and other data needed to prove compliance with specified requirements.

##### 1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - 2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
  - 5. ASTM A641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  - 6. ASTM F668 - Standard Specification for Poly Vinyl Chloride (PVC) - Coated Steel Chain Link Fence Fabric.
- C. Federal Specification
  - 1. Federal Specification RR-F-191/1D -Fencing, Wire and Post, Metal (Chain-Link Fence Fabric).
  - 2. Federal Specification RR-F-191/2D -Fencing, Wire and Post, Metal (Chain-Link Fence Gates).
  - 3. Federal Specification RR-F-191/3D - Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces).
  - 4. Federal Specification RR-F-191/4D - Fencing, Wire and Post, Metal (Chain-Link Fence Accessories).
  - 4. Federal Specification RR-F-191K/GEN - Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric and Accessories).

- D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. The chain link fencing and accessories shall conform to Federal Specification RR-F-191 and its associated detail specifications noted below.

### 2.02 FABRIC

- A. The chain link fabric shall conform to Federal Specification RR-F-191/1D. The chain link fabric shall be Type I. The fabric shall be 9-gauge (0.148-in) core wire, woven in a 1 3/8-inch mesh and be hot dipped galvanized after weaving and be in accordance with ASTM A392. The fabric shall also be **black vinyl** coated. The height of fabric shall be 96-inches (8 feet), unless otherwise indicated on Contract Drawings. Fabric shall be fastened to intermediate posts with No. 6 aluminum fabric wire spaced 12-inches apart and to top, bottom and brace rails with 9 gauge wires spaced 24-inches apart. The fabric shall be securely fastened to all terminal and gate posts with 1/4-inch by 3/4-inch stretcher bars with No. 11 gauge pressed steel bands spaced 12-inches apart. Stretcher bars for security fencing shall be 3/8-in by 3/16-in. All bands, wires and tension bars shall conform to Federal Specification RR-F-191/4D.

### 2.03 POSTS, RAILS, AND BRACES

- A. Posts, rails and braces shall conform to Federal Specification RR-F-191/3D and be fabricated of Class I (round steel sections), Grade A (hot-dipped galvanized), seamless steel pipe, in accordance with ASTM A53 (Schedule 40), PVC coated to match fabric and be of the following sizes:
  1. Corner and Terminal Posts: SP3
  2. Line Posts: SP2
  3. Gate Posts: SP4
  4. Rails and Braces: SPI (1.66-in o.d.)
  5. Spacing of posts shall not exceed 10-ft.

### 2.04 DOUBLE GATE

- A. Gate and hardware shall conform to Federal Specification RR-F-191/2D. Gate shall be 16-foot wide double swing gate.
  1. The double swing gate shall be constructed of Class I, Grade A seamless steel pipe, size SP 1, plus additional intermediate members when required and meeting the requirements of RR-F-191/3D. Gate frame shall be of welded construction or shall be assembled using fittings. When fittings are used as the construction method for gate frame, the frame shall be fitted with 3/8-in minimum diameter adjustable length truss rods, meeting the requirements of Federal Specification RR-F-191/4D. When frame is welded, all welding shall be done prior to galvanizing. Gate fabric shall be of the type, mesh, gauge, color and salvage as that specified above for fabric. Install fabric with stretcher bars at vertical edges and tie wires at top and bottom edges. Attach stretcher bars to gate frame at not

more than 12-inch o.c., provide additional horizontal and/or vertical members to ensure proper gate operation and for attachment of fabric, hardware and accessories.

2. Double Swing Gate Hardware
  - a. Components finish and appearance shall match the fence.
  - b. The gate shall be operated manually by one person.

## 2.05 BARBED WIRE

- A. Provide three (3) lines of barbed wire consisting of two (2) strands of twisted wire with four (4) point barbs on five (5) inch spacing.
  1. Barbed wire shall be zinc coated and conform to ASTM A585, chain link fence grade.

## 2.06 CONCRETE

- A. Concrete for post bases (footings) shall be as specified in Section 03301, Field Concrete.
  1. 28-day strength: 3,000 psi.

## 2.07 ACCESSORIES

- A. Accessories shall conform to Federal Specification RR-F-191/4D, shall be PVC coated to match fabric. In addition to wire ties and clips, brace bands, tension bands and bars, tension wire and truss rods (all of which are described hereinbefore), accessories shall include the following:
  1. Caps for all exposed ends of posts.
  2. Top and bottom rail and brace ends or other suitable means of connection.
  3. Top and bottom rail sleeves to allow for expansion and contraction of the rail.
  4. Extension Arms: to accommodate 3 strands of barbed wire, single arm, 45 degrees.
  5. Barbed wire per ASTM A121 galvanized steel or ASTM A585 aluminum coated steel; 12 gage thick wire, 2 strands, and 4 points at 3 inch on center.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Set all posts to depth of 3-ft unless otherwise shown on the Drawings. After setting and plumbing posts, fill holes with 3,000 psi concrete. Crown top surface of concrete to shed water. Brace all terminal posts horizontally with sections used for top rail. The top rail shall extend through all line posts to form a continuous brace from end to end of each stretch of fence, be securely fastened at the end of each run and have joints made with expansion sleeve couplings not less than 6-in long.

END OF SECTION

## SECTION 02513

### ASPHALTIC PAVEMENT

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Provide asphaltic pavement and appurtenant items as required by the Contract Documents.
  - 1. In general the Contractor shall provide all labor, equipment, and materials, and perform all operations in connection with the installation of asphaltic pavement, berms, pavement markings, calcium chloride, final grade adjustments of valve boxes, manhole and catch basin castings, and preparation of the trench.

##### 1.02 RELATED WORK

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

##### 1.03 STANDARDS

- A. All paving shall comply with the Commonwealth of Massachusetts Department of Public Works Standard Specifications for Highways and Bridges, hereinafter called Standard Specifications, as referenced.

##### 1.04 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Materials list of items proposed to be provided under this Section.
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

#### PART 2 PRODUCTS

##### 2.01 GRAVEL SUBBASE

- A. Shall be as specified in Section 02222, Earthwork.

##### 2.02 ASPHALTIC PAVEMENT

- A. Bottom and Top Course:

1. Shall be Class I asphaltic pavement conforming to Sections 420, 460 and M3 of the Standard Specifications.

2.03 ASPHALT TACK COAT

- A. Shall consist of either emulsified asphalt, grade RS-1 conforming to Section M3.03.1, or cutback asphalt, grade RC-70 or RC-250 conforming to Section M3.02.0 of the Standard Specifications.

2.04 PAVEMENT MARKING PAINT

- A. Shall be High Heat Rapid Drying Traffic Marking Material conforming to Section M7.01.09, (Yellow High Heat Rapid Drying Traffic Marking Material) of the Standard Specifications.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINAL PREPARATION OF SUBGRADES

- A. Gravel Subbase:
  1. Minimum compacted depth shall be shown on details, of 12 inches as measured from the bottom of the pavement.
  2. Spread and compacted in layers not exceeding 6 inches in depth, compacted measurement.
  3. All layers shall be compacted to not less than 95 percent of the maximum dry density of the material as determined by the standard AASHTO Test Designation T99 Compaction Test Method C at optimum moisture content.

3.03 GENERAL

- A. All asphaltic pavement thickness referred to in this Section shall be compacted thickness.
- B. No asphaltic pavement shall be placed when the air temperature is below forty (40) degrees Fahrenheit, or when the material on which the mix is to be placed contains frost.
- C. Maintain asphaltic pavement under this Contract during the guarantee period of one (1) year.
  1. Promptly refill and re-pave all areas which have settled or are otherwise unsatisfactory for traffic.



### 3.04 PLACEMENT OF ASPHALTIC CONCRETE PAVEMENT

- A. Bottom Course:
  - 1. Shall be utilized as the base course of the roadway.
  - 2. Edges of the existing pavement shall be brushed clean and the specified tack coat applied.
  - 3. Pavement compacted thickness shall be a minimum of two and one half (2-1/2) inches, placed in a single lift unless otherwise detailed on the Drawings.
  - 4. Placed with a self propelled spreader.
  - 5. Compaction shall be accomplished with a self propelled roller, with a weight of approximately 285 pounds per inch of roller width.
  - 6. Bottom course pavement shall be maintained by the Contractor until top course pavement is placed.
  
- B. Trench Top Course Resurfacing:
  - 1. The bottom course shall be swept clean of all foreign matter and loose material.
  - 2. Depressions in the bottom course resurfacing shall have a leveling course applied before the top course paving begins.
  - 3. The surface receiving the top course shall be completely dry prior to the application of the tack coat.
  - 4. Tack coat shall be applied at the rate of 0.25 gallons per square yard. The contact surface of the curbing, castings and other structures shall be painted with the tack coat.
  - 5. All castings (frames and covers, valve boxes), shall be raised to finish grade before the top course is applied.
  - 6. The equipment used for spreading and finishing shall be a mechanical self powered paver capable of spreading and finishing the mixture true to line, grade, width and crown by means of fully automated controls for both longitudinal and transverse slope.
  - 7. Top course pavement compacted thickness shall be a minimum of one and a half (1-1/2) inches.
  - 8. Compaction shall be accomplished with a self propelled roller with a weight of approximately 285 pounds per inch of roller width.

### 3.05 CASTING ADJUSTMENTS

- A. Where asphaltic pavement is to be applied, manhole and catch basin frames and valve boxes are to be adjusted to the grade of the new pavement.
  - 1. A neat line shall be cut in the pavement around the existing frames and valve boxes.
  - 2. The material; gravel, pavement and concrete collar (if applicable) shall be removed down to six (6) inches below the frame.
  - 3. The frame shall be freed from its existing grout bed and shimmed with steel shims of the appropriate thickness, at a minimum of four (4) alternate locations, so as to insure that the frame will not rock. The frame shall then be set into a full bed of grout, and a concrete collar placed around the frame, up to within two (2) inches of finish grade.
  - 4. The frame shall be protected from damage from traffic until the concrete has taken a firm set.

3.06 DUST CONTROL TREATMENT

- A. Calcium chloride shall be applied only upon direction of the Engineer.
  - 1. The roadway shall be swept clean and calcium chloride spread at a uniform rate over the prepared gravel trench surface.

END OF SECTION

SECTION 02829

ELECTRIC BARRIER GATE

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work included: Work shall consist of furnishing and installing a high-performance commercial DC barrier gate and operator at the entrance to the Mary Dunn No. 1 Tank site, as shown on the Contract Drawings. The gate shall deter unauthorized access to the tank site and utilize FOB Readers installed at the entrance and exit sides of the gate to open and close the gate when entering and exiting. After the gate is triggered to open and a vehicle passes through, it shall automatically close.

1.02 RELATED WORK

- A. Documents affecting the work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
  - 1. Section 03301 Field Concrete
  - 2. Division 16 Electrical

1.03 REFERENCES

- A. National Electrical Manufacturers Association (NEMA): NEMA ICS 6 – Industrial Control and Systems: Enclosures
- B. Underwriters Laboratories (UL): UL 325 – Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.
- C. Underwriters Laboratories (UL): UL 991 Standard for Tests for Safety-Related Controls Employing Solid-State Devices.
- D. International Organization for Standardization: ISO 9001 – Quality Management Systems.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Equipment list, system description, electrical wiring diagrams for installation, and manufacturer's data sheets on each product to be used, including:
  - 1. Preparation of instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, edge conditions, and accessories.
  - 1. Operation, installation, and maintenance manuals including wiring diagrams.
  - 2. Risers, layouts and special writing diagrams showing any changes to standard drawings.

## 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials and products in strict compliance with manufacturer's instructions and industry standards.
- B. Store products indoors in manufacturer's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect from damage.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 Certified Manufacturer.
- B. Installer Qualifications: Installation performed by factory authorized contractor specifically trained in gate operation systems of the type found within this section.
  - 1. Provide documentation of maintenance and repair service availability for emergency conditions.
  - 2. Provide quarterly maintenance for one year following Substantial Completion of the Project.

## 1.07 WARRANTY

- A. Manufacturer's Standard Limited Warranty:
  - 1. Warranty Period: 2 years for operator, 10 years for operator frame.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturer: LiftMaster; 845 Larch Avenue; Elmhurst, IL 60126-1196. ASD. Toll-Free: 800.282.6225. Email: specs@LiftMaster.com. Web: LiftMaster.com, or approved equal.

### 2.02 GATE OPERATORS

- A. Gate Operator: LiftMaster MA Series High-Performance Commercial Barrier Gate Operator, or approved equal.
  - 1. LiftMaster MA Mega Arm Pedestal Barrier Gate Operator with plastic cover.
  - 2. Compliance: UL Listed. Compliant to the UL 325, UL 991 and CSA C22.2 No. 247 standards.
    - a. This model is intended for use in Class I, II, III, and IV vehicular barrier gate applications.
  - 3. Warranty: 2 years for operator, 10 years for operator frame.
  - 4. Operation:
    - a. Soft start/stop.
    - b. Universal Controller: 8 inputs right or left-handed operation safety-stop.
    - c. Anti-tailgate, quick-close features.
    - d. Selectable Auto Open: 15 seconds after power failure or upon battery depletion barrier arm can be set to automatically open. 15-second delay helps reduce nuisance callbacks due to short power interruptions or brownouts.
  - 5. Operator Speed: Open or close speed of 2.5 seconds.

6. Gate Arm: Breakaway arm; held in place with breakaway retaining nuts. If arm is hit, it will break away and can be re-installed; can be set up for right or left-hand mount.
7. Gate Arm: red/white retro-reflectorized DOT tape.
  - a. Gate Arm Length: 12 feet (3658mm).
8. Motor: 1/2 HP, 24V DC, 800 RPM motor, 6,000 cycles per day.
9. Electrical Power Requirements: 120/220V AC.
10. Gear Reduction: 60:1 reducer in synthetic oil bath.
11. Chassis: Powder-coated 1/4-inch (6 mm) aluminum alloy.
12. Drive System: No. 80 gearbox.
13. Built-in Receiver: Single remote control solution for gate access and additional access points. Ability to add up to 50 remote control.
14. Magnetic Limit Sensors: Designed for high-cycle applications, contain no moving parts to wear out, provide reliable operation.
15. Surge Protection: Built-in at point of incoming line voltage from power spikes, surges.
16. Auxiliary Outlet: Powers accessories devices.
17. Battery Backup: Provides operation during power outages to maintain traffic flow.
18. Automatically resets to normal operation when power is restored; provides up to 900 full cycles with a 12 foot (3658 mm) arm.
19. Accessories: Provide the optional accessories listed below.
  - a. Clutch: Allows arm to be manually pushed open. Arm automatically resets to normal closed position upon receiving activation. Ideal for areas that are concerned with vandals damaging arm.

## PART 3 EXECUTION

### 3.01 EXAMINATION AND PREPARATION

- A. Inspect and prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions.
- B. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- C. If preparation is the responsibility of another installer, notify Engineer in writing of deviations from manufacturer's recommended installation tolerances and conditions

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions. Test for proper operation and adjust until satisfactory results are obtained.
- B. Install power supply cable enclosed in Conduit No. 3 (Set B) as indicated on the Conduit Schedule on the Contract Drawings from the barrier gate to new circuit breaker in the Control Building per the manufacturer's recommendations.

3.03 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 02840

TIMBER GUARDRAIL

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Included: Work under this item shall consist of a single timber rail and post guardrail as shown on the Contract Drawings. It shall be erected in the locations sited and fabricated in conformity with the designations, dimensions and details shown on the plans or as ordered by the Engineer.

1.02 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300, Shop Drawings, Product Data, and Samples.

1.03 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610, Product Handling.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Timber: All timber rail and block-out components shall conform with the following:
1. Commercial lumber grade No. 1 or better after treatment;
  2. AASHTO M 168;
  3. Minimum stress rating of 1350 psi
  4. S4S (surface four side) Southern Yellow Pine with nominal dimensions as indicated on the plans. Variations in the size of any dimension shall not be more than + 1/4-inch.
  5. All timber components shall be pressure treated with CCA or ACZA depending on species supplied conforming to AWPA Standard P5 to a minimum net retention of 0.60 lb/cubic foot in the assay zone in accordance with AWPA Standard C14.
  6. All timber components shall be fabricated (including but not necessarily limited to cutting, drilling, dapping and chamfering) prior to treatment.
  7. All timber components shall be free of excess preservative and solvent at the conclusion of the treating process. Post treatment cleaning shall be by expansion bath or steaming in accordance with AWPA Standard C2;
  8. Kiln or air dried to a maximum moisture content of 25% after treatment (KDAT - 25);
  9. Grade-marked after treatment by an agency certified by the American Lumber Standard Committee (ALSC).
- B. Fasteners: Round head bolts shall be manufactured in accordance with the sizes designated on the plans, the geometric specifications included in ANSI B18.5.1.2.2 and

the material specifications for ASTM A588 steel. All round head bolts shall be marked with the manufacturer's symbol and A588. Hex Lag Screws shall be manufactured in accordance with ASTM A307 Grade A specifications. All Hex Lag Screws shall be hot-dipped galvanized in accordance with ASTM A153 Class C.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Posts: The posts shall be placed in dug hole and backfilled and thoroughly compacted around prior to installing the rails. The posts shall be set plumb and in alignment with the rails.
- B. Rails: The rail elements shall then be bolted into place to produce a smooth continuous rail as shown on the Contract Drawings.

END OF SECTION



SECTION 02930

LOAM AND SEED

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work included: Provide loam and seed as required by the Contract Documents.
  - 1. Generally the Work consists of topsoiling, seeding and fertilizing all disturbed areas of the water main easements.

1.02 RELATED WORK

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
  - 1. Section 02110 Clearing and Grubbing
  - 2. Section 02222 Earthwork

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
  - 1. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- B. If the results of the hydraulic seeding operation (if utilized) are unsatisfactory, the method shall be abandoned and seeding shall be required by the sowing method.

1.04 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Materials list of items proposed to be provided under this Section.
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- C. If hydroseeding application is to be used, a written description containing seed analysis, fertilizer and lime addition data is to be submitted for review of the Owner.

1.05 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610.
- B. Immediately remove from the site, materials which are not true to name, and do not comply with the specified requirements, and promptly replace with materials meeting the specified requirements.

PART 2 PRODUCTS

2.01 TOPSOIL

- A. Topsoil stripped from the site and stored, shall be approved before reuse.
  - 1. Topsoil from the site shall be treated to conform to the requirements for topsoil furnished from offsite sources.
  - 2. If the required quantity of suitable topsoil is not available from stripping of the site, or if it is not approved, topsoil from outside sources shall be furnished.
  - 3. Stockpiled topsoil used for this work shall be screened before being spread.
  - 4. Surplus topsoil not required to fulfill the requirements of the Contract shall be properly disposed of unless otherwise directed by the Owner.

2.02 TOPSOIL FURNISHED FROM OFFSITE SOURCES

- A. Topsoil shall be fertile, friable, natural topsoil typical of the locality, and obtained from a well-drained site.
  - 1. It shall be without admixture of subsoil or slag.
  - 2. Shall be screened.
  - 3. Topsoil as delivered to the site shall have an acidity range of pH 5.0 to 6.5 and shall contain not less than 5% organic matter as determined by loss on ignition of moisture-free samples dried at 100 degrees Centigrade.
  - 4. If required, limestone shall be added to the topsoil to adjust the pH, so that it complies with the required limits.
- B. Mechanical Analysis: Topsoil shall meet the following mechanical analysis

Size	% Passing	% Retained
1-1/4" screen	100	0
1/2" screen	97-100	0-3
No. 100 mesh sieve	40-60	40-60

2.03 TREATING TOPSOIL WITH LIMESTONE OR ALUMINUM SULFATE

- A. When the hydrogen-ion value is below the specified level, add ground limestone at the rate of 2-1/2 lbs. per cubic yard of topsoil to raise pH one full point.
- B. The following table shows the amount of limestone needed for various soil reactions on the basis of 1,000 sq. ft. and on the basis of one (1) acre:

pH	pH Desired	Lbs. per 1000 sq. ft.	Tons per Acre
6.0	6.5	0-46	0-1
5.5	6.5	46-92	1-2
5.0	6.5	92-138	2-3

- 1. Limestone shall be raw, ground agricultural limestone containing not less than 90% calcium carbonate and shall be ground to such fineness that 50% will pass through a 100-mesh sieve and 90% will pass through a 20-mesh sieve.
- 2. When hydrogen-ion value is above specified level, add aluminum sulfate at the rate of 2-1/2 lbs. per cubic yard of topsoil to lower the pH one full point.

Aluminum sulfate shall be unadulterated and delivered in containers with the name of the material, name of the manufacturer, and net weight of contents.

2.04 LIME

- A. Lime shall be ground limestone containing not less than 85 percent calcium and magnesium carbonates.
  - 1. Ground to such fineness that at least 50 percent will pass through a 100-mesh sieve and at least 90 percent shall pass through a 20-mesh sieve.

2.05 GRASS SEED (UPLANDS)

- A. General: Provide grass seed which is:
  - 1. Free from noxious weed seeds, and re-cleaned.
  - 2. Grade A recent crop seed.
  - 3. Treated with appropriate fungicide at time of mixing.
  - 4. Delivered to the site in sealed containers with dealers guaranteed analysis.
  
- B. Proportions by Weight (Level Areas):
 

1. Chewing Fescue	60 percent.
2. Red Top	10 percent.
3. Annual Ryegrass	10 percent
4. Kentucky Blue	20 percent.
  
- C. Proportions by Weight (Slopes):
 

1. Creeping Red Fescue	50 percent.
2. Perennial Rye Grass	20 percent
3. Red Clover	10 percent.
4. Winter Rye	15 percent
5. Ladino Clover	5 percent
  
- D. Requirements:
  - 1. Seed shall be furnished and delivered premixed in the proportions specified above.
  - 2. All seed shall comply with State and Federal seed laws.
  - 3. A certificate of compliance with the specifications shall be submitted by the manufacturer with the shipment of the seed. The certificate shall include the guaranteed percentage of purity, weed content and germination of the seed, net weight and date of shipment.
  - 4. No seed shall be sown until the Contractor has submitted the above mentioned certificate to the Engineer.

2.06 FERTILIZER

- A. Fertilizer shall be furnished in containers plainly marked with the chemical analysis of the product and showing one of the following compositions by weight.

Constituent	10-6-4	8-6-4	7-7-7
Nitrogen	10% min.	8% min.	7% min.
Available Phosphoric Acid	6% min.	6% min.	7% min.
Water Soluble Potash	4% min.	4% min.	7% min.

1. Fertilizer shall be stored so that when used it will be dry and free flowing.

## 2.07 HYDRAULIC SPRAY MACHINE

- A. Shall be designed specifically for seed dissemination.
- B. Shall allow materials to be mixed with water in the machine and kept in an agitated state to keep materials uniformly suspended in the water.
- C. Shall be designed to provide equal quantities of required materials over a particular spraying area.

## PART 3 EXECUTION

### 3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 APPLICATION

- A. Application of Topsoil
  1. Topsoil shall be applied to the prepared subgrade specified.
  2. Topsoil shall be spread to a compacted depth of:
    - a. Four (4) inches for cross country areas.
    - b. Areas to have topsoil applied to them shall be scarified or otherwise roughened, just prior to the application.
- B. Seedbed Preparation
  1. Grade areas to be seeded to a smooth uniform grade.
  2. Roll, scarify, rake and level as necessary to obtain true, even surfaces
  3. Meet existing grades.
  4. All seeded areas shall slope to drain.
  5. All finish grades shall meet approval before grass seed is sown.
- C. Application Rates of Limestone, Aluminum Sulfate, Fertilizer and Seed
  1. Limestone or Aluminum Sulfate shall be applied and thoroughly incorporated in the layer of loam or topsoil to adjust the acidity of the material.
  2. The rate of application of the limestone will be determined by the pH value.
  3. Fertilizer shall be applied at the rate of 20 pounds per 1000 square feet.
  4. The seed mixture shall be sown at the rate of 5 pounds per 1000 square feet.
- D. Fertilizing and Liming
  1. Fertilizing and liming shall be done when the soil is in a moist condition and at least 24 hours before the sowing of the seed.
  2. The fertilizer and lime shall be applied to the soil by means of a mechanical spreader or other approved method capable of maintaining a uniform rate of application.
  3. Thoroughly harrowed, raked or otherwise mixed with the soil to a depth of not less than 2 inches.
  4. The fertilizer and lime shall not be applied together.

- E. Time of Seeding
  - 1. The recommended seeding periods are from April 1 to June 1, and from August 15 to October 1.
  - 2. The Contractor may choose to seed at other times but regardless of the time of seeding he shall be responsible for a full growth of grass.
  - 3. When directed he shall re-fertilize and reseed areas on the project which do not develop a satisfactory growth of grass.
  - 4. Re-fertilizing and reseeding shall be incidental to the original seeding item requirements.

### 3.03 SEEDING METHODS

- A. Fertilizer, limestone, and mulch material, if required, and seed of the type specified may be placed by one of the following methods, provided an even distribution is obtained.
- B. Dry Method
  - 1. Power Equipment: Mechanical seeders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical seeding equipment or attachments may be used when seed, limestone, and fertilizer are to be applied in dry form.
  - 2. Manual Equipment - On areas which are inaccessible to power equipment, permission may be given to use hand-operated mechanical equipment when the materials applied are in dry form. The use of hand shovels to spread the materials shall not be allowed.
  - 3. When the dry method is used, limestone and fertilizer shall not be mixed together prior to their application, but shall be worked into the soil together to a depth of at least 2 inches.
  - 4. At least 24 hours shall elapse between the time fertilizer is incorporated into the topsoil and seed is spread.
  - 5. Areas covered with park seed shall be raked, and, rolled with a roller weighing not more than 100 pounds per foot of roller width to firm the soil but not to pack it. The rolling shall be done the same day as the seeding unless otherwise permitted.
  - 6. Areas seeded in the spring after April 15 shall be covered with a 1 inch loose layer of clean wheat or oat straw. The straw shall be kept wet until a catch of grass is established. Loose straw shall be removed from the site.
  - 7. Grass on slopes or banks may be established by another method subject to approval. Special care shall be exercised to prevent erosion or washouts.
- C. Hydraulic Method
  - 1. The application of grass seed, fertilizer, limestone, and a suitable mulch, if approved, may be accomplished through the use of an approved spraying machine.
  - 2. The materials shall be mixed with water in the machine and kept in an agitated state in order for the materials to be uniformly suspended in the water.
  - 3. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of limestone, fertilizer, and grass seed shall be equal to the required rates.
  - 4. Prior to the start of work, the Engineer shall be furnished with a certified statement for approval as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the hydroseeder.
  - 5. The hydraulic seeding and fertilizing machine shall be completely flushed and cleaned each day before seeding is started.

6. If the results of the spray operations are unsatisfactory, the Contractor shall be required to abandon this method and apply the materials in accordance with the dry method.
7. When the hydraulic method is used, compaction or rolling shall be required.

D. Side Slopes Application

1. Roadway side slopes shall be seeded utilizing a hydraulic (hydro-seed) application process, to place seed and fertilizer simultaneously.
2. A color agent shall also be within the hydraulic mix.
3. Care shall be taken during the application to prevent coverage of poles, trees, signs, and etc.

3.04 MAINTENANCE

- A. The Contractor shall be responsible for the proper care of the seeded areas during the period when the grass is becoming established.
1. This period shall extend for two months after a successful uniform stand of grass is produced.
  2. The Contractor shall reseed all areas as necessary to obtain a uniform stand of grass, free from bare spots.
  3. Any seeded areas which fail to show a uniform stand of grass shall be reseeded until all areas are covered
  4. Any and all additional seeding shall be at the Contractor's expense.
  5. If necessary, barricades of brush or other materials and suitable signs shall be placed to protect the seeded areas.
  6. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until a good sod is established.

3.05 GUARANTEE PERIOD

- A. All seeded areas shall be guaranteed by the Contractor for not less than one (1) full year from the date of substantial completion.

END OF SECTION

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DIVISION 3 GENERAL REQUIREMENTS

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SECTION 03301

FIELD CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED:

- A. Field placed concrete and all related items necessary to place and finish the concrete work.

1.02 RELATED WORK:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 and 16 specification sections, apply to this section.
  - 1. Section 02444 – Vinyl-Coated Fence
  - 2. Section 02829 – Electric Barrier Gate

1.03 REFERENCES:

- A. The following standards are a part of this specification:

American Concrete Institute (ACI):

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

ACI 305 - Recommended Practice for Hot Weather Concreting

ACI 306 - Recommended Practice for Cold Weather Concreting

ACI SP-66 ACI Detailing Manual

ACI 318 - Building Code Requirements for Reinforced Concrete

American Society for Testing and Materials (ASTM):

ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM C33 - Concrete Aggregates

ASTM C94 - Ready-Mixed Concrete

ASTM C 143 - Test for Slump of Portland Cement Concrete

ASTM C 150 - Portland Cement

ASTM C260 - Air Entraining Admixtures for Concrete

ASTM C494 - Chemical Admixtures for Concrete



## 1.04 SUBMITTALS

Three copies of the statement of materials constituting the design of mixes for each size aggregate as required by ASTM C94 shall be submitted to the DPW Engineer within one week following award of the Contract.

## PART 2 PRODUCTS

### 2.01 CONCRETE:

- A. All concrete shall have a 28 day compressive strength of 3000 psi unless otherwise noted. A minimum of 5.5 sacks of cement per cubic yard and a maximum water cement ratio of 6.9 gallons per sack shall be used.
- B. Concrete shall conform to ASTM C94. The Contractor shall be responsible for the design of the concrete mixtures. Slump shall be a maximum of 4-inches and a minimum of 2-inches, determined in accordance with ASTM C 143.
- C. Admixtures shall be as specified in subsection 2.05. No additional admixtures shall be used unless approved by the Engineer.
- D. No water additional to the amount indicated by the design mix shall be added to the concrete without the prior permission of the Engineer.

### 2.02 REINFORCING:

Reinforcing as shown on the plans or as directed by the Engineer, shall conform to ACI 318 and ASTM A615 and shall be detailed in accordance with ACI SP-66. All Steel reinforcing bars shall be grade 60.

### 2.03 CEMENT:

The cement shall be an approved brand of American manufactured Portland Cement, Type II conforming to the applicable requirements of ASTM C150.

### 2.04 AGGREGATES:

Except as otherwise noted, aggregate shall conform to the requirements of ASTM C33.

### 2.05 ADMIXTURES:

- A. Unless otherwise directed, concrete shall contain an air entraining agent of 4 to 8 percent by volume.
- B. Accepted Manufacturers:
  - 1. W.R. Grace & Company
  - 2. Sika Chemical Company
  - 3. Johns Manville
  - 4. Or approved by Engineer equal.

### 2.06 WATER:

Water for concrete shall be clean potable water.

## PART 3 EXECUTION

### 3.01 PREPARATION:

- A. Before placing concrete, forms and the space to be occupied by the concrete shall be cleaned. The reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, or any material which would reduce the bond.
- B. Earth, concrete, masonry, or other water permeable material against which concrete is to be placed shall be saturated with water immediately before concrete is placed.
- C. No concrete shall be placed until the arrangement have been inspected and approved by the Engineer.

### 3.02 CONCRETE PLACING DURING COLD WEATHER:

- A. Concrete shall not be placed on frozen ground, and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when temperature is below 40°F, or is expected to fall to below 40°F, within 72 hours, and the concrete after placing shall be protected by covering, heat, or both.
- B. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer.
- C. All procedures shall be in accordance with provisions of ACI 306.

### 3.03 CONCRETE PLACING DURING HOT WEATHER:

- A. The forms and reinforcement shall be sprinkled with cold water immediately before placing concrete.
- B. The Contractor shall make every effort to minimize delays which will result in excessive mixing of the concrete after arrival on the job.
- C. Immediately after placement, concrete shall be protected from the direct rays of the sun.
- D. During periods of 90°F or above, ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 90°F, when ready for placement, will not be acceptable, and will be rejected.

### 3.05 FIELD QUALITY CONTROL:

- A. Concrete inspection and testing shall be performed by an inspection laboratory, approved and paid for by the Owner. Contractor shall provide full assistance and cooperation for taking concrete samples.
- B. At least 4 standard compression test cylinders shall be made and tested and 1 slump test from each day's placement of concrete. A minimum of four compression test cylinders shall be made and tested for each 100 cubic yards of each type of concrete placed. One cylinder shall be tested at 7 days, and two at 28 days. The fourth cylinder from each set shall be kept until the 28 day test report on the second and third cylinders in the same set has been received. If the average compressive strength of the two 28 day cylinders do not achieve the required

level, the Engineer may elect to test the fourth cylinder immediately or test it after 56 days. If job experience indicates additional cylinder tests or other tests are required for proper control or determination of concrete quality, such tests shall be made.

- C. The Engineer shall have the right to reject concrete represented by low strength tests. Rejected concrete shall be removed and replaced with concrete, conforming to the specification.

END OF SECTION

## SECTION 03600

### GROUT

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to install grout complete as shown on the Drawings and as specified herein.

##### 1.02 RELATED WORK

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
  - 1. Section 01010 Summary of Work.

##### 1.03 SUBMITTALS

- A. Shop drawings and product data in accordance with Section 01300 showing materials of construction and details of mixing and installation for:
  - 1. Commercially manufactured nonshrink cementitious grout and underlayment grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations and conformity to the specified standards.
  - 2. Cement grout: The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures and the proposed mix of the grout.
- B. Samples:
  - 1. Submit samples of commercially manufactured grout products when requested by the Engineer.
  - 2. Submit aggregates proposed for use in mixes when requested by the Engineer.
- C. Qualifications:
  - 1. Grout manufacturers shall submit documentation that they have at least ten years experience in the production and use of the grouts which they propose to supply.

##### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C33 – Standard Specifications for Concrete Aggregates,
  - 2. ASTM C150 – Standard Specifications for Portland Cement,
  - 3. ASTM C827 – Standard Test Methods for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures,
  - 4. ASTM C1107 – Standard Specifications for Packaged Dry, Hydraulic – Cement Grout (Nonshrink).

- B. U.S. Army Corps of Engineers Standard (CRD):
  - 1. CRD-C 621 – Corps of Engineers Specification for Nonshrink Grout.
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.05 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Grout manufactures shall have a minimum of ten years experience in the production and use of grout proposed for the work.
- B. Services of Manufacturer's Representative:
  - 1. A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout and underlayment grout. Additional services shall also be provided, as required, to correct installation problems.
- C. Field Testing:
  - 1. All field testing and inspection services required shall be provided by the Owner. The Contractor shall assist in the sampling of materials and shall provide any ladders, platforms, etc. for access to the work. The methods of testing shall comply in detail with the applicable ASTM Standards.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers and printed instructions.
- B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to six months or the manufacturer's recommended storage time, whichever is less.
- C. Material which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the Owner.

#### 1.07 DEFINITIONS

- A. Nonshrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base plate.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. The use of a manufacturer's name and product or catalog number is for the purpose of establishing the standard of quality desired.
- B. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

### 2.02 MATERIALS

- A. Nonshrink Cementitious Grout:
  - 1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C1107 Grades B or C and CRD-C 621. Grouts shall be portland cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.
    - a. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; Set Grout by Master Builders, Inc.; Euco NS by The Euclid Chemical Co.; NBEC Grout by Five Star Products, Inc. or equal.
    - b. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by Master Builders, Inc.; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; Five Star Grout by Five Star Products, Inc. or equal.
- B. Cement Grout:
  - 1. Cement grout shall be a mixture of one part portland cement conforming to ASTM C150 types I, II, or III and one to two parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.
- C. Water:
  - 1. Potable water, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Grout shall be placed over cured concrete which has attained its full design strength unless otherwise approved by the Engineer.
- B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance and paints and free of all loose material or foreign matter which may affect the bond or performance of the grout.

- C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to ensure bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.
  - 1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the air line to prevent oil from being blown onto the surface.
- D. Remove all loose rust, oil or other deleterious substances which may affect the bond or performance of the grout from metal embedments or bottom of baseplates prior to the installation of the grout.
- E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the Engineer. Upon completion of the 24 hour period, visible water shall be removed from the surface prior to grouting.
- F. Construct grout forms or other leakproof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place and shored to resist the forces imposed by the grout and its placement.
- G. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.
- H. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks, or other approved means. The shims, wedges, and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the Engineer. Grout voids created by the removal of shims, wedges and block.

### 3.02 INSTALLATION – GENERAL

- A. Mix, apply and cure products in strict compliance with the manufacturer's recommendations and these specifications.
- B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.
- C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40 degrees F and 90 degrees F during grouting and for at least 24 hours thereafter or as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.
- D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60 degrees F and 90 degrees F range.

- E. Install grout in a manner which will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.
- F. Inspect all existing underlying expansion, control and construction joints through the grout.

### 3.03 INSTALLATION – CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

- A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel or admixtures without prior approval by the Engineer.
- B. Do not mix by hand. Mix in a mortar mixer (with moving blades). Pre-wet the mixer and empty excess water. Add premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.
- C. Placements greater than 3-in in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.
- D. Provide forms where and as required. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement shall proceed in a manner which will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.
- F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise ordered and approved by the Engineer. Finish this surface with a wood float or brush finish.
- G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

END OF SECTION



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DIVISION 5 METALS

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## SECTION 05520

### ALUMINUM DOME ROOF

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. This section defines the design requirements for the aluminum self-supporting tank dome structure as described in the contract drawings and documents.

##### 1.02 SUBMITTALS

- A. Before executing any of the work in this section, design drawings shall be produced by the roof manufacturer and submitted to the engineer showing dimensions, sizes, thickness, gauges, materials, finishes, joint attachment and erection procedure for the proposed roof, hatches, finial vent, and all other roof appurtenances. These design drawings shall be stamped and signed by a registered professional engineer in the Commonwealth of Massachusetts.
- B. A complete set of design calculations for the dome shall also be produced by the roof manufacturer and submitted. These calculations shall be stamped and signed by a registered professional engineer in the Commonwealth of Massachusetts. All work shall be fabricated and erected in accordance with the approved drawings and calculations.
- C. Certification that the specified material alloys, sizes and quantities have been furnished shall be submitted upon completion of the project.

##### 1.03 REFERENCES

- A. The following codes and standards form a part of this section to the extent specified herein:
  1. ASTM C509 Standard Specifications for Elastomeric Cellular Preformed Gasket and Sealing Material
  2. ASTM C1115-00 Standard Specification for Dense Elastomeric Silicone Rubber Gaskets
  3. ASTM C920 Standard Specification for Elastomeric Joint Sealants
  4. Aluminum Association Specifications for Aluminum Structures
  5. Aluminum Association Aluminum Design Manual 2010; Specifications and Guidelines for Aluminum Structures
  6. ASCE 8-02 Specification for the Design of Cold-Formed Stainless Steel Structural Members
  7. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
  8. Federal Specification TT-S-00230C
  9. Federal Specification A-A-59588

## PART 2 PRODUCTS

### 2.01 DESCRIPTION

- A. The dome roof shall be clear-span and self-supporting from the peripheral structure with primary horizontal forces contained by an integral aluminum tension ring (unless otherwise specified). The frame shall consist of aluminum structural members with the joints arrayed on the surface of a sphere. The arrangement of members shall result in a pattern of triangular spaces. These spaces shall be closed with light gauge aluminum panels. The members shall be joined by means of bolting their flanges to aluminum gusset plates.
- B. All metal components of the aluminum dome structure shall be non-corrugated aluminum or 300 series stainless steel. No galvanized, aluminized, painted, or plated steel shall be used anywhere in the dome above the mounting bracket base plates. Dissimilar materials in the supporting structure shall be isolated from the aluminum dome by means of a compatible elastomeric gasket.
- C. The entire structure shall be designed as a watertight system under all design load and temperature conditions. The design shall include all sealant joints to be tooled slightly concave after sealant is applied to the gusset covers' outside connection. Care shall be taken to keep sealant confined to the joint area, and any outside of the joint shall be removed so that the panels will be free from misplaced sealant. All sealants shall be placed only in a manner as recommended by the sealant manufacturer.
- D. The aluminum closure panels shall be attached continuously along their edges to the structural members by means of batten bars, which engage the panels in an interlocking joint. These batten bars shall also secure an elastomeric weatherseal gasket that shall form a continuous watertight seal along the panel edges. The top surface of the batten bars must be completely flush with the panel surfaces and shall in no way allow water to pond at the cover joints. Designs that incorporate raised battens, overlapping panels and/or designs that incorporate fasteners which penetrate panels and attach to structural members are expressly prohibited.
- E. Roof panels shall be fabricated from continuous 3003-H16 aluminum sheeting.
- F. Connection forces shall be transferred through gusset plates connected to the top and bottom flanges of the beam struts. The connections shall be designed as moment connections; a minimum of four bolts shall be used to connect the gusset plate to each strut flange.
- G. The structural analysis shall be performed using non-linear, second order, stiffness analysis models. The structural computer models shall include the effect of geometry irregularities such as dormer openings and perimeter support members. Full provisions shall be made to allow for thermal expansion.
- H. Fasteners shall be designed with a factor of safety of 2.34 on ultimate strength and 1.65 on yield strength.

## 2.02 EXPERIENCE/QUALIFICATIONS

- A. No equipment shall be supplied by any manufacturer not regularly engaged in the manufacturing and production of domes in the size and character herein specified. The manufacturer must have designed, manufactured and installed at least one (1) dome of 9 similar size as the unit specified herein. This dome must be in satisfactory use for a period not less than ten (10) years.
- B. The roof manufacturer must own and operate its own US-based manufacturing facility, and the use of a fabrication facility that is not US-based and/or owned and operated by the cover manufacturer is expressly prohibited. Manufacturers that do not meet these qualifications will not be considered.
- C. The roof manufacturer must be ISO 9001 certified.

## 2.03 MATERIALS

- A. The following is a summary of approved materials and/or material specifications. All aluminum alloys shall be as defined by the Aluminum Association and published in the ALUMINUM STANDARDS AND DATA.
  - 1. Bolts and Fasteners – Threaded fasteners shall be 300 series stainless steel per ASTM F593, Alloy Group 1. Lockbolts shall be 7075-T73 aluminum, 304 or 305 stainless steel. Screws shall be aluminum or 300 series stainless steel.
  - 2. Plates and Sheets - Plate and sheet material shall be aluminum alloy 3003-H16, 3105-H154, 6061-T6, 5052-H32 or 5052-H36; mill finish AA - M10 as fabricated. Minimum thickness for gussets shall be 5/16". Sheet materials shall be 0.05-inch minimum thickness.
  - 3. Structural Shapes - Aluminum structural shapes shall be alloy 6061-T6. The aluminum structural members shall be a minimum of 6 inches deep. To improve torsional stability, the dome's structural members must incorporate a double web. The use of I-beams with only a single web is expressly prohibited.
  - 4. Tension Ring - Tension ring structural shapes shall be 6061-T6 aluminum. Design of the tension ring shall be based on the net cross section of the members and shall not include top flange protrusions used for panel attachment, bolt holes, or outstanding legs that are not connected through the joints.
  - 5. Miscellaneous Shapes - Miscellaneous aluminum shapes shall be alloy 6061-T6 or 6063-T5.
  - 6. Gaskets - All gaskets shall be ozone resistant Silicone or Neoprene only. If Neoprene gaskets are utilized they must be shielded from exposure to ultraviolet light. The gaskets must have a 1/8-inch minimum thickness.
  - 7. Sealant - All sealants shall be silicone and resistant to ozone and ultraviolet light and conform to Federal Specification TT-S-00230C.
  - 8. Miscellaneous Penetration Seals - All other penetration seals shall be weatherproof rubber seals.
  - 9. Support Bearings - Acceptable bearing surfaces for sliding bearing are Teflon to stainless steel only. In order to avoid damage to the Teflon and to reduce the coefficient of bearing friction, Teflon shall not bear on aluminum surfaces. Dome supports shall utilize only bolted connections. The use of aluminum structural welding at the dome supports is expressly prohibited.
  - 10. Factory-Applied Coating – All triangular aluminum panels shall receive a factory-applied, baked-on coating finish. Color shall alternate international orange and white from one panel to the next and meet FAA obstruction marking

requirements. Factory-applied baked-on finish shall be Kynar 500 and applied at a thickness that meets coating manufacturer and aluminum dome manufacturer requirements.

## 2.04 APPURTENANCES

### A. Roof Vent

1. An aluminum vent assembly in accordance with AWWA D103 shall be furnished and installed above the maximum water level. A curbed opening shall be provided at the apex of the dome. At maximum possible rate of water fill or withdrawal, the resulting interior pressure or vacuum will not exceed 0.5 inch water column. Protection against birds and protection against ice plugging shall be provided. An insect screen shall be provided and designed to open should the screen become plugged by ice formation.
2. The vent shall be constructed of aluminum such that the hood can be unbolted and used as a secondary roof access.
3. Size, design, and location of roof vent to be provided by roof manufacturer.

### B. Roof Ladder materials shall consist of:

1. Extruded shapes and bars – Alloy 6061-T6.
2. Bolts, nuts, washers – 304 stainless steel.
3. Concrete anchors – 304 stainless steel (for support arms from ladder to pedestal wall).
4. Nosings – Aluminum extruded reinforced profile with non-slips ribs.

### C. Handrail materials shall consist of:

1. Posts and horizontals – 1-1/2-inch SCH 40 6061-T6 Aluminum pipe.
2. Toe plate – 4-inch where required.
3. All hardware – 304 stainless steel.
4. Post base flanges – shall be aluminum.
5. Post spacing – Not to exceed 5-foot 6-inches.

### D. Roof Ladder Fabrication:

1. Brackets will bolt directly to aluminum dome roof using stainless steel anchors and fasteners.
2. Platform Sections.
  - a. Where indicated will be shop assembled in sections.
  - b. Weld corners and seams continuously complying with AWS recommendations at exposed connections, grind exposed welds smooth and flush.
3. Finish – Aluminum roof ladder framing and treads to be mill finish.
4. Standards:
  - a. Complies with OSHA codes.
  - b. Designed to support a superimposed live load of 60 PSF.

### E. Handrail Fabrication:

1. Handrail shall be provided on both sides of stairs.
2. All joints to be machine coped and continuously welded and buffed to a smooth finish.
3. Finish – All handrails to be clear anodized after fabrication.
4. Standards:
  - a. Complied with OSHA codes.

- b. Designed for 200 pound loads or 50 pounds per square foot.
- F. Tank roof shall include two (2) roof manway hatches:
- 1. Each manway hatch shall be 30-inch square.
  - 2. Opening shall have a curb of at least 4-inch in height, and the cover shall have a downward overlap of at least 2-inch.
  - 3. Constructed of aluminum.

## 2.05 DESIGN LOADS

- A. The entire dome structure shall be designed to sustain the loads specified herein, with the stress limitations of the Aluminum Association SPECIFICATIONS FOR ALUMINUM STRUCTURES. For members subjected to axial forces and bending moments due to load eccentricity or lateral loads, the combined member stresses shall be determined by adding the stress component due to axial load to the stress components due to bending in both the major and minor axis. In no case shall the dome be designed for any loads less than those specified by the local building code and/or local amendments.
- B. The load cases to be considered shall be those described below unless more severe loads are specified by the purchaser.
- 1. Dead Load – The dead load shall be defined as the weight of the structure and all permanently attached to and supported by the structure.
  - 2. Live Load – As required per ASCE 7-10 Section 4.8.2.
  - 3. Snow Load – As required per ASCE 7-10 Chapter 7 but not less than required by local building codes and/or local amendments.
    - a. Importance Factor ( $I_s$ ) = 1.1 or greater per ASCE 7-10 Table 1.5-2 for Risk Category III.
    - b. Exposure Factor ( $C_e$ ) = 1.0 or greater per ASCE 7-10 Table 7-2.
    - c. Thermal Factor ( $C_t$ ) = 1.2 or greater per ASCE 7-10 Table 7-3.
    - d. Slope factor ( $C_s$ ) = ASCE 7-10 Figure 7-2 or greater.
  - 4. Unbalanced Snow Load – As required per ASCE 7-05 Section 7.6.4 and Figure 7-3 but not less than AWWA D108 Sec. 5.3 and as required by local building codes and/or amendments.
    - a. Importance Factor ( $I_s$ ) = 1.1 or greater per ASCE 7-10 Table 1.5-2 for Risk Category III.
    - b. Exposure Factor ( $C_e$ ) = 1.0 or greater per ASCE 7-10 Table 7-2.
    - c. Thermal Factor ( $C_t$ ) = 1.2 or greater per ASCE 7-10 Table 7-3.
    - d. Slope factor ( $C_s$ ) = ASCE 7-10 Figure 7-2 or greater.
  - 5. Wind Load:
    - a. Wind Design Load = 155 mph (sustained)
    - b. Gust Wind Load = 200 mph.
  - 6. Load Combinations – As required per ASCE 7-10 Section 2.4.1 for allowable stress design and Section 2.3.2 factored loads strength design and as required by AWWA D108 Sec. 5.3
  - 7. Temperature - The load combinations listed above shall be considered for a temperature change of 100 degrees F below the installation temperature and 100 degrees F above the installation temperature and for a material temperature range of 40 degrees F below 0 to 160 degrees F above zero.
  - 8. Panel Design Load - In addition to the above mentioned loads and load combinations, the aluminum panels shall be designed for a 250 pound load distributed over one square foot at any location and a plus or minus 60 psf load distributed over the entire area of any given panel. These loads are to be taken as

acting separately from one another and not simultaneously with other design loads.

## 2.06 MANUFACTURERS

- A. The aluminum dome shall be as manufactured by CST Covers - Conroe, Texas (936) 539-1747 or Rincon, Georgia (310) 353-5100, or approved equal.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. All work shall be executed by skilled mechanics with a supervisor experienced in the erection of domes. The dome shall be erected plumb and level and in proper alignment.
- B. Field re-fabrication of structural components or panels will not be accepted. Forcing of the structure to achieve fit-up during construction is expressly forbidden and not acceptable.
- C. All gasket materials shall be continuous; splices will not be allowed. All sealants shall be placed only in a manner as recommended by the sealant manufacturer.

### 3.02 WARRANTY

- A. The dome manufacturer shall warrant that the work described herein shall be free from defects, workmanship and material. The dome manufacturer shall replace or repair only faulty workmanship or defective material furnished by it that is reported to it within one (1) year from the date of completion of this scope of work.

END OF SPECIFICATION

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DIVISION 9 FINISHES

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09970	Power Tool Clean and Spot Coat Painting Repairs	09970-1 thru 09970-10



SECTION 09970

POWER TOOL CLEAN AND SPOT COAT PAINTING REPAIRS

1.01 DESCRIPTION - SCOPE AND SCHEDULE OF WORK

- A. The work of this section includes all labor, materials and equipment, whether of a permanent or temporary nature, and all operations necessary and required in connection with power tool cleaning, spot coat repairs, and coating of all coated steel for all surfaces and items specified herein or evidently required to complete the work.
- B. 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.

1.02 SANITARY REQUIREMENTS

- A. The Contractor and all workmen employed by him shall conduct all operations in a clean and sanitary manner. No nuisance shall be committed in a tank; the workmen shall either use proper waste receptacles or leave the tank whenever necessity arises. The Contractor shall make arrangements for portable sanitary facilities to be located onsite.

1.03 PROTECTION OF SURROUNDING PROPERTY

- A. The Contractor shall be responsible for coordinating the removal any vehicles from the area surrounding the tank during the painting. The Contractor shall be responsible for protection of all buildings and other property surrounding the tank and guarantee by use of the necessary precautions against any damage to same caused by falling materials or paint. In any case where property is damaged, the Contractor shall correct same prior to any payment.

1.04 PERSONAL SUPERVISION BY CONTRACTOR

- A. The Contractor or his duly authorized and approved representative shall give personal attention to the fulfillment of the Contract. The Contractor shall have on the work site, at all times, a competent, English speaking representative authorized to receive and execute any orders or directions of the Owner and/or any emergency personnel. The representative should also accept any notices given to the Contractor under the provisions of the Contract.

1.05 SUBMITTALS

- A. Schedule
  - 1. Prior to ordering any coatings or doing any field work, the Contractor shall submit to the Engineer a complete listing of all products he intends to use, indicating the surfaces and areas for each product, and stating the number of coats and the dry film thickness (DFT) of each coat. All coatings to conform to materials outlined herein.

- B. Performance Criteria
  - 1. Performance criteria indicating the proposed coating meets or exceeds ASTM test requirements for abrasion resistance, chemical resistance, adhesion and accelerated weathering, and any other pertinent test methods associated with water tank exterior coating performance.
- C. Failure to include items A and B will be considered to be an incomplete submittal.
- D. The Contractor is to submit a preliminary construction schedule for completion of the project.

#### 1.06 GENERAL REQUIREMENTS

- A. The Contractor shall examine the specifications and the drawings for the various trades, in connection with painting and finishing, and shall understand that all materials and equipment throughout the work which obviously require a painter's finish, and which are left unfinished by others, shall be painted to completion by this Contractor as a part of the work.
- B. All coatings, are to comply with all current regulations and standards carrying the appropriate approvals from National Sanitation Foundation (N.S.F.) Standard 61 for Coatings and Lining, and meet current US EPA requirements for Volatile Organic Compounds (VOC) Compliance Level. All coatings shall meet and shall limit VOCs to the maximum allowable under the current OTC VOC Compliant Regulations. The Engineer may require custom colors. Substitutions will be considered only if a product for product listing in at least as much detail as the list below is submitted. The Engineer reserves the right to request and receive detailed technical literature of each proposed substitution before approving any alternatives. When a material of a different generic type is proposed, the Contractor shall also state his reasons for offering such material, and shall include evidence of satisfactory performance on regional water tanks for a minimum 5-year history. Substitutions will not be considered that change the number of coats or do not meet specified total dry film thickness. No consideration will be given to using one manufacturer's products under another's procedures.
- C. Guarantee. It will be the Contractor's obligation to guarantee his workmanship. Such guarantees shall state the products used will adhere to the surface without peeling and cracking, scaling, alligating, blistering, or fading for a period of at least one year from the date of acceptance of the painting work. Upon written notice of paint failure by any of the above, or similar reasons, the Contractor shall prepare surfaces, repaint the surface without additional cost to the Owner. If it is determined that the product chosen was faulty, the Contractor will still have the obligation of removing and replacing the coating without further expense to the Owner. Should the Contractor have any reservation that the product specified will not perform as intended, he shall so notify the Engineer and shall not proceed with that work until agreement is reached on mutually acceptable products.

#### 1.07 QUALITY ASSURANCE

- A. General: Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application and observation throughout the duration of

the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the Engineer. The Owner reserves the right to have observation performed by an "Owner's Representative" during the project.

- B. **Competent Workers to be Employed:** The Contractor shall employ only competent and skillful men to do the work, and whenever the Owner shall notify the Contractor in writing that any man on the work is, in his opinion, disrespectful, or otherwise unsatisfactory, the Contractor, on receiving such notice shall forthwith dismiss such person and shall not again employ him on any part of the work without the written consent of the Owner. The Contractor shall also employ a full time supervisor/foreman, who will be on-site at all times and responsible for the coordination of all activities and schedules between the Contractor and Owner as well as the performance of all work outlined herein.
- C. **Surface Preparation:** Surface Preparation for the tank exterior and appurtenances where spot coat repairs are required at locations damaged or exposed during construction shall be based upon comparison with Commercial Grade Power Tool Cleaning, SSPC – SP15, and tank interior and exterior Surface Preparation where spot coat repairs are required at rivet and steel overlap seam repair locations shall be based upon comparison with Power Tool Cleaning, SSPC-SP11, (Latest Version Thereof).
- D. **Application:** No coating or paint shall be applied when the surrounding air temperature of the surface to be coated or painted is below manufacturers printed instructions; to wet or damp surfaces or in rain, snow, fog or mist; when the surface temperature is less than 5 degrees Fahrenheit above the dewpoint; when it is expected the air temperature will drop below recommended temperatures six hours after application of coating or paint. Dewpoint shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with US Department of Commerce Weather Bureau Psychrometric Tables.
- E. **Thickness and Holiday Checking:** Thickness of coatings and paint shall be checked with a non-destructive, magnetic type thickness gauge, which shall be supplied by the Contractor and available for use at the site in accordance with SSPC-PA #2. Dry film measurement should be performed in accordance with SSPC – PA 2 measurement of dry paint thickness with magnetic gages. Holiday detection shall be performed after the coating has been allowed to cure for a minimum of two (2) days. The Owner reserves the right to use a high voltage holiday detector supplied by the Contractor to check the finished paint film integrity in accordance with the paint manufactures recommended testing procedures. All holidays shall be marked, re-coated in accordance with the manufacturer's printed recommendations and retested. The Contractor shall supply touch up kits of the specified coating system to be used during the touch up process as needed. No pinholes or other irregularities will be permitted in the final coatings.
- F. **Observation Devices:** The Contractor shall furnish, until final acceptance of coatings and painting, observation devices in good working condition for detection of holidays and measurement of dry-film thickness gauge and certified instrumentation to test accuracy of holiday detectors.

G. Imperfect Work or Materials

Any defective or any imperfect work or materials furnished by the Contractor, that may be discovered before the final acceptance of the work as established by the Owner's "Certificate of Completion" shall be removed immediately even though it has been overlooked by the Owner and estimated for payment. Any materials condemned or rejected by the Engineer shall be marked so conspicuously and shall, on demand, be at once removed to a satisfactory distance from the work. Satisfactory work or materials shall be substituted for that rejected.

1.08 OBSERVATION

- A. All cleaning and painting shall be subject to routine observation by a representative of the owner and/or an independent observer engaged by the Owner.
- B. The Owner reserves the right to observe all cleaned surfaces prior to primer application and also each coat of paint prior to subsequent paint application. It is understood that such observation shall be made available to the Owner at any time during the performance of work. The Contractor will give at least (24) hour notification to the Owner/Owner's representative as to insure availability for observation.
- C. The Contractor shall correct such work as is found defective under the specification and supply such materials required to make the repairs at his own expense. If the dry film thicknesses of the applied coatings do not comply with the specified dry film thicknesses outlined, the Contractor shall apply additional coats of paint as necessary to insure compliance with the contract specifications, at no extra cost to the Owner.
- D. The Contractor shall maintain adequate and secure rigging facilities for use of the Owner's Observer. Scaffolding, boatswain chairs, spiders or other rigging, removed prior to observation, shall be replaced at the Contractor's expense, as required by the Owner for thorough observation of the work. All applicable provisions of OSHA shall be adhered to.

1.09 FINAL CLEAN UP

- A. Before the final acceptance of the Project, the Contractor shall remove all equipment, temporary work, unused and useless materials, rubbish, and temporary buildings, shall repair or replace in an acceptable manner other private or public property which may have been damaged or destroyed on account of the prosecution of the work and shall leave the site of the project and adjacent public and private property in a neat and presentable condition wherever his operations have disturbed conditions existing at the time starting work.

1.10 RELEASE ON FINAL PAYMENT

- A. The payment, for the final amount due under this Contract, shall release the Owner and every agent or employee of the Owner, and the agent and employees of any such agent, from any or all claims or liabilities on account of work performed under the Contract or any alteration thereof.

- B. The Contractor shall be responsible for any and all damages caused to the surrounding buildings and landscaping and the Owner shall deduct from this Contract amount any damages not compensated by insurance of Contractor. Payment for final cleaning up and restoration of property, as above provided, will be included in the prices bid for the various scheduled items.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. The materials and products specified herein are manufactured by the Tnemec Company.
- B. Coating Systems shall conform to all current regulations and standards carrying the appropriate approvals from N.S.F. (National Sanitation Foundation) Standard 61 for Coatings and Linings. All coatings shall meet all current U.S.E.P.A Requirements for V.O.C. (Volatile Organic Compounds) Compliance Level.
- C. All materials shall be bought to jobsite in original sealed containers. They shall not be used until the engineer has observed contents and obtained data from information on containers or label. Materials exceeding storage life recommended by the manufacturer shall be rejected.
- D. All coatings and paint shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable coatings or paint must be stored to conform to City, County, State and Federal safety codes for flammable coating or paint materials. At all times, coatings and paint shall be protected from freezing.

### 2.02 PAINT

- A. Exterior and Interior surface preparation.
  - 1. The tank exterior and appurtenances where spot coat repairs are required at locations damaged or exposed during construction shall receive the following surface preparation:
    - a. Exterior Surface Preparation: SPPC-SP15, Commercial Grade Power Tool Cleaning.
- B. Exterior and interior repairs at rivets and steel overlap seams surface preparation.
  - 1. The tank exterior and interior where spot coat repairs are required at rivet and steel overlap seam repair locations shall receive the following surface preparation:
    - a. SSPC-SP11: Power Tool Cleaning.
  - 2. Following surface preparation, the tank exterior and interior where spot coat repairs are required for rivet and steel overlap seams, shall receive one (1) polyamide epoxy prime coat, and one (1) modified polyurethane coat, after the prime coat has cured, as outlined below. The system specified below is as manufactured by Tnemec Company, or approved equal.
    - a. Polyamide epoxy rime coat: Pota-Pox, Series 20HS.
    - b. Modified polyurethane coat: Elasto-Shield TG, Series 265.

- c. All materials shall be applied strictly in accordance with the manufacturer's instructions with regard to surface preparation, pre-treatments, mixing and thinning, temperature of material and substrate, curing or drying times, and all similar recommendations.
- C. Exterior and Interior Spot Coat Repairs
- 1. The tank exterior, interior, and appurtenances where spot coat repairs are required at locations damaged or exposed during construction, or received repairs to rivet and/or steel overlap seams (after polyamide epoxy prime coat and modified polyurethane coat applied as noted in 2.02 (B)), shall receive one (1) mastic waterborne acrylic primer spot coat (as required), one (1) intermediate spot coat, and two (2) finish spot coats as outlined below. The system specified below is as manufactured by Tnemec Company. Use of an accelerator will be required for cold weather application.
    - a. Mastic Waterborne Acrylic Primer Spot Coat: Tnemec Series 118 Uni-Bond Mastic 30GR, as required.
    - b. One (1) Intermediate Spot Coat: Tnemec Series 118 Uni-Bond 1281.
    - c. Two (2) Finish Spot Coats: Tnemec Series 73 Endura-Shield.
      - i. Color to match existing.

## PART 3 EXECUTION

### 3.01 GENERAL

- A. All surface preparation, coating and painting shall conform to applicable standards of the Steel Structures Painting Council, and the manufacturer's printed instructions. Materials applied prior to approval of the surface by the Engineer shall be removed and reapplied to the satisfaction of the Engineer at the expense of the Contractor.
- B. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the finish must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.
- C. Coating and painting systems include surface preparations, prime coating and finish coatings. Unless otherwise specified, prime coating shall be field applied. Where prime coatings are shop applied, the Contractor shall instruct suppliers to provide the prime coat compatible with the finish coat specified. Any off-site work, which, does not conform to this specification is subject to rejection by the Engineer.
- D. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air.
- E. Application of the first coat shall follow immediately after surface preparation and cleaning within an eight (8) hour work day. Any cleaned areas not receiving a first coat within an eight (8) hour period or is exhibiting "Rust Bloom" shall be re-cleaned prior to application of the first coat.

### 3.02 APPLICATION

- A. The Contractor shall apply the paint to the tank by the method, which protects the surrounding homes, buildings, tanks, automobiles and any other structures or equipment.
- B. The Contractor should note that the paint manufacturer or the Owner does not assume any responsibility for damage to vehicles or structures. Accordingly, the Contractor is hereby given notice that he shall be required to use the utmost precaution and to take special care in the method and manner of applying the paint to the structures and facilities of the Owner. Furthermore, by the execution of this Contract to paint the structures and facilities in question, the Contractor shall be deemed to have agreed to indemnify and save harmless the Owner, from and against any and all liability and cost, which the Owner may incur as the result of any damage to vehicles or any structures or property of any nature in the surrounding area, attributable to and /or caused by the application of the paint to the structures and facilities of the Owner.
- C. Paint thickness and methods of application shall be as specified. If the thickness of the coatings is less than that specified, additional coats will be required.

### 3.03 WORKMANSHIP AND MATERIAL

- A. All work and material shall be the best of its kind and shall conform to AWWA D102-78 "Painting Steel Water-Storage Tanks" and ANSI A159.1-1972, Section II, "Surface Preparation Specifications" (latest revisions thereof) as approved by the Steel Structures Painting Council.

### 3.04 BRUSH REMOVAL

- A. The Contractor will remove all brush, bushes, small trees and/or any other form of vegetation that may be growing along the perimeter of the tank as well as the perimeter of the foundation that may require spot coat repairs so that these areas can be properly accessed for cleaning and painting.
- B. All materials removed from around the tank site will not be allowed to be stored on site and shall be disposed of in a proper manner.

### 3.05 WORKER PROTECTION

- A. The Contractor shall minimize exposure through the use of engineering controls, proper protective equipment and good work practices.
- B. The contractor will be responsible for development and implementation of a worker protection program.
- C. The contractor shall have on-site washing facilities and "Clean Areas" for changing clothes.
- D. All workers shall wear coveralls, gloves, hard hats and goggles. All street clothes shall be kept in a clean area, separate from the work clothes. All work clothes shall be removed before eating and after clean-up of the work area.

- E. Eating, drinking, smoking and chewing tobacco or gum shall be prohibited in the work area. No food or drink shall be stored in the work area. Prior to eating, all persons shall wash their hands, arms and face with liquid soap and warm water and shall rinse their mouths thoroughly.
- F. The Contractor will also provide the Owners' Observer with appropriate respirators, in addition to all other safety equipment he/she might require while on the job site.

### 3.06 SURFACE PREPARATION

- A. Power Tool Clean and Spot Maintenance: The tank exterior and appurtenances where spot coat repairs are required due to damaged or exposed coating locations as a result of construction shall be spot power tool cleaned.
  - 1. Spot power tool cleaned shall be in accordance with the SSPC-SP15 Commercial Grade Power Tool Cleaning, wherever the coatings are found to be defective. Rust, rust scale, and cracked, loose and/or peeling paint will all be considered defects in the coating. Areas shall be prepared using a roto peening preparation tool with shrouded HEPA vacuum attachment. Vacuum equipment shall be sufficient for use with the proposed surface preparation equipment.
  - 2. All areas of power tool cleaning shall be cleaned to the degree in which the edges of the existing coating are feathered back to sound, tight paint material.
  - 3. All cleaned surfaces will be primed within 8 hours of cleaning and before rusting occurs. In the event that rusting occurs prior to priming, these areas will have to be recleaned to the degree originally specified.
  - 4. All surfaces cleaned of all residue, prior to priming.
- B. Power Tool Cleaning: The tank exterior and interior where spot coat repairs are required at rivet and/or steel overlap seam repairs shall be Power Tool Cleaned.
  - 1. Power Tool Cleaned shall be in accordance with SSPC-SP11 Power Tool Cleaning, at locations that require rivet and/or steel overlap seam repairs, prior to application of polyamide epoxy prime coat and modified polyurethane coat, as identified in 2.02 (B).

### 3.07 PAINTING

- A. All paints and coatings shall be applied strictly in accordance with the manufacturer's instructions with regard to surface preparation, pretreatments, mixing and thinning, temperature of material and substrate, curing or drying times before recoating, and all similar recommendations. Where pretreatments or subsequent coats required for film build with the products specified are omitted by virtue of the manufacturer's recommendations, a credit will be taken by the Owner for each coat omitted.
- B. No painting shall be done when temperatures are below 40°F, and no epoxy painting shall be done when temperature is less than 40°F. In general, the temperature shall be 40°F, or over, or as recommended by the manufacturer.
- C. Manufacturer's Product Data Sheets are to be incorporated as part of this specification and the Material Safety Data Sheets (MSDS) on all applicable paint materials and solvents shall be available and posted prior to commencement of work.



- D. All painting practices shall be in complete accordance with the normal standards of good painting practice as outlined by the Steel Structures Painting Council in the SSPC Manuals Volume 1 and 2.
- E. Any areas not finished to the complete satisfaction of the Owner, or Owner's representative shall either be removed and re-applied (all coats) or shall be given extra coats at his direction, to bring the total film thickness up to a minimum of dry mils.
- F. The manufacturer's recommended drying time and application procedure will be strictly adhered to.
- G. The coatings are to be cured for a minimum of seven (7) days at 70°F, or in accordance with Manufacturer's recommendations, at the end of which time a solvent rub test will be performed to test the state of cure. If the coatings are not fully cured additional cure times will be outlined.
- H. The Contractor is to provide a void free continuous coating therefore the Owner reserves the right to use a high voltage holiday detector to check the finished paint film integrity. Any holidays found as a result of this test will be re-coated and the area re-tested after the coating has dried. This procedure will be repeated at no additional cost to the Owner until there are no holidays in the applied system.
- I. Paint System:
  - 1. Number of coats and thickness requirements will vary with substrate, application method and exposure. Contractor shall comply with requirements as stated by manufacturer.
- J. Tank Spot Coat Repairs
  - 1. The tank exterior, interior, and appurtenances where spot coat repairs are required at exterior locations damaged or exposed during construction and rivet and steel overlap seam repair locations (after polyamide epoxy prime coat and modified polyurethane coat applied as noted in 2.02 (B)), shall receive one (1) mastic waterborne acrylic primer spot coat (as required), one (1) intermediate spot coat, and two (2) finish spot coats as outlined below. Use of an accelerator will be required for cold weather application.
    - a. Surface Preparation: Exterior and Interior surface preparation defined under 2.02 (A), (1) and (2) of this specification.
    - b. Mastic Waterborne Acrylic Primer Spot Coat - Dry Film Thickness: 6.0 to 7.0 mils
    - c. One (1) Intermediate Spot Coat – Dry Film Thickness: 6.0 to 7.0 mils
    - d. Two (2) Finish Spot Coats - Dry Film Thickness: 2.5 to 3.0 mils per coat
    - e. Total Dry Film Thickness (including Spot Coat): 17.0 to 20.0 mils
  - 2. The specified coatings may be applied by spray brush and roller methods in accordance with the manufacturer's recommendations. Special attention shall be given to all seams, and the finish coat is to be uniform in appearance, with full gloss retention and a minimum of runs and sags. No spray application of the coatings will be allowed unless the containment screens are left in place and effectively capture any and all overspray.

- K. New steel overflow pipe, ladder, ladder cage, and ladder security gate:
  - 1. Surface preparation and coating shall be factory applied.
  - 2. Coating shall adhere to the spot coating schedule identified under 3.07 (J). Each coat shall be applied as a full coat.
  - 3. Color to match existing.
  
- L. Existing foundation anchor bolts and stools, and top rim of the tank including top ring angle and brackets:
  - 1. Surface preparation and coating shall be field applied.
  - 2. Surface preparation and coating shall adhere to the spot coating schedule identified under 3.07 (J). Each coat shall be applied as a full coat.
  - 3. color to match existing.

### 3.08 TESTING

- A. The Owner reserves the right to require holiday testing. If required, a high voltage holiday detector supplied by the Contractor to check the paint film integrity shall be used. The Contractor will be required to recoat any holiday's detected and retested after the coating has dried. The Contractor shall supply touch up kits of the specified coating system to be used during the touch up process as needed.

### 3.09 REPAIR

- A. Damaged Materials: Repair or replace damaged materials and surfaces not scheduled to be coated.
  
- B. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

### 3.10 ACCEPTANCE

- A. The basis for acceptance of the coating work is listed below. Deviations beyond these parameters shall, at the Engineer's discretion, be corrected by the Contractor at his own expense and in accordance with the manufacturer's recommendations.
  - 1. No runs or sags
  - 2. No overspray or roughness
  - 3. No holidays or pinholes
  - 4. No color or gloss variations
  - 5. Allowable film thickness +2.0 mils over specified thickness.
  
- B. Additional coats shall be applied as required to attain the minimum dry film thickness specified for the painting system.

END OF SECTION

INDEX

DIVISION 16 ELECTRICAL

SECTION	SUBJECT	PAGES
16050	Basic Electrical	16050-1 thru 16050-9
16110	Raceway	16110-1 thru 16110-5
16120	Wires and Cables	16120-1 thru 16120-5
16130	Cabinets, Boxes, and Fittings	16130-1 thru 16130-5
16450	Grounding	16450-1 thru 16450-4

SECTION 16050

BASIC ELECTRICAL

PART 1 GENERAL

1.01 SCOPE

- A. The ELECTRICAL SUBCONTRACTOR shall provide the labor, tools, equipment, and materials necessary to furnish and install the complete electrical work in accordance with the plans and as specified herein. The work shall include but not be limited to the following:
1. Complete electric service including primary and secondary duct banks, conductors, main circuit breaker, grounding, metering, etc.
  2. Complete power distribution systems including switchboards, panelboards, motor control centers, transformers, over current devices, wiring devices, raceway, cable, wire and etc.
  3. All motor wiring, safety disconnects, and motor starters unless integral with equipment.
  4. Complete emergency power system including generator, transfer switches, and associated equipment, at designated sites.
  5. Control wiring not provided by other Divisions.
  6. Complete grounding and surge protection system.
  7. All support material and hardware for raceway, cable tray and electrical equipment.
  8. Underground system.
  9. Termination of all cable and wire unless otherwise noted. This includes, but is not limited to, final termination of all control and instrumentation wiring in Process Equipment and PLC control panels and consoles.
  10. Start up, acceptance testing test reports and instruction of systems operation to the OWNER.
- B. This section also includes general construction materials and methods for application with electrical installations as follows:
1. Miscellaneous metals for support of electrical materials and equipment.
  2. Joint sealers for sealing around electrical materials and equipment.
    - a. Concrete used for the following:
      1. Housekeeping pads.
      2. Pipe supports.
    - b. Temporary utilities and connections include the following:
      1. Temporary electric service.
      2. Temporary service.
      3. Temporary lighting to provide adequate illumination of work areas and security.
- C. Related Work. Division 16 is responsible for installation, wiring and raceways for electrically operated equipment, cabinet, starters, controls, instrumentation, PLC's, control panels and related items furnished under other divisions. Division 16 shall

furnish and install disconnect switches for equipment furnished under other divisions. This shall include but not be limited to the following:

1. Process equipment control panels.
2. PLC control panels, consoles and instrumentation.

D. Related Work Not Included:

1. Excavation and backfilling including gravel or sand bedding for underground electrical work, concrete encasement for conduit shall be performed by the GENERAL CONTRACTOR under other divisions of this specification.

E. Examination of Site:

1. Before submitting a bid, the ELECTRICAL SUBCONTRACTOR shall visit and carefully examine site to identify existing conditions and difficulties that may affect the Work of this Section. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions.

## 1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to this section.

## 1.03 QUALITY ASSURANCE

- A. Codes and Standards. Perform all work associated with basic electrical materials in compliance with applicable requirements of governing agencies having jurisdiction and in accordance with these plans and as specified herein. Where provisions of the pertinent codes and standards conflict with this specification, the more stringent provision shall govern.

1. Massachusetts Electrical Code (MEC).
2. National Fire Protection Association (NFPA).
3. Underwriters Laboratories, Inc. (UL).
4. Local and State Building Codes.
5. All electrical equipment shall be listed and labeled by UL or an approved independent nationally recognized electrical testing laboratory.

B. Inspector Certifications

1. Provide two copies of the electrical inspector's certificate of approved showing acceptability of work done under this contract.

## 1.04 SUBMITTALS

- A. Furnish manufacturer's product data, test reports, and materials certifications as required.
- B. Follow the procedures specified in Division 1 Section "Submittals" and in addition, the ELECTRICAL SUBCONTRACTOR shall prepare and submit a complete submittal list to the Owner's Representative. The submittal list shall include all submittal items covered in the Division 16 specification sections.

- C. Shop drawings shall be submitted to the Owner's Representative for approval. Shop drawings shall identify the specific equipment and material being supplied; the quantity being supplied; and all accessories, dimensions, descriptions, mounting and connection details, wiring diagrams, elementary control diagrams, equipment interface diagrams and any other information necessary to determine compliance with the plans and specifications. Fabrication and installation shall be in accordance with the approved shop drawings.
- D. As-built copies of all shop drawings shall be submitted to the ENGINEER. This shall include but not limited to the following:
  - 1. Switchboards.
  - 2. Motor Control Centers.
  - 3. PLC and Control Panels.
- E. Permits and Easements. Submit copies of reports, permits, and easements necessary for installation, use, and operation.
- F. Test Reports. Submit copies of reports of tests, inspections, and meter readings as specified. Tests, inspections, and meter readings shall be performed using the CONTRACTOR's temporary power source unless otherwise specified.

#### 1.05 RECORD DRAWINGS

- A. The ELECTRICAL SUBCONTRACTOR shall maintain a complete and separate set of prints of Contract Drawings and specifications at job site for duration of the contract. The ELECTRICAL SUBCONTRACTOR shall record work completed and all changes from original Contract. Drawings shall clearly and accurately include work installed as a modification or as an addition to the original design.
- B. At completion of work and prior to final request for payment, the ELECTRICAL SUBCONTRACTOR shall submit a complete set of reproducible record drawings showing all systems as actually installed.

#### 1.06 JOB CONDITIONS

- A. Existing Conditions:
  - 1. Maintain and protect existing building services, which transit the area affected by selective demolition.
  - 2. Existing Utilities. Locate existing underground utilities in excavation areas. If utilities are indicated to remain, support and protect services during excavation operations.
  - 3. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
  - 4. Verify that the electrical installation may be made in complete accordance with all pertinent codes and regulations and the original design.

B. Coordination.

1. Coordinate the installation of electrical items with the schedules for work of other trades to prevent unnecessary delays in the total work.
2. Coordinate with all utility and telephone companies and make all installations for their services in accordance with all utility company requirements.
3. Any changes shall be done at the ELECTRICAL SUBCONTRACTOR'S expense.
4. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, furnish and install all required supports and wiring to clean the encroachment.
5. Any work installed contrary to or without acceptance by the ENGINEER shall be subject to change as directed by the ENGINEER, and no extra compensation will be allowed to the ELECTRICAL SUBCONTRACTOR for making these changes.

C. Accuracy of Data:

1. The Drawings are diagrammatic and functional only, and are not intended to show exact circuit layouts, number of fittings, components and place in satisfactory operational power, lighting, and other electrical systems shown. Install additional circuits, components and material wherever needed to conform to the specific requirements of the equipment whether or not indicated or specified.
2. Information and components called for in the specification but not shown on plans or vice versa, shall apply and shall provided as though required expressly by both.
3. The locations of equipment, fixtures, outlets and similar devices shown on the Drawings are approximate only. Field measurements shall take precedence over scaled dimensions from Drawings. Exact locations shall be as accepted by ENGINEER during construction. Obtain in the field all information relevant to the placing of electrical work and, in case of any interference with other work, proceed as directed by the ENGINEER and furnish all labor and materials necessary to complete the work in an acceptable manner.
4. The Contract Drawings and the specifications are intended to comply with all pertinent codes, regulations and standards. In the event of discrepancy, the ELECTRICAL SUBCONTRACTOR shall immediately notify the ENGINEER in writing of said discrepancies and apply for an interpretation and, unless an interpretation is offered in writing by the ENGINEER prior to the execution of the Contract, the applicable rules and regulations shall be complied with as a part of the Contract.
5. In case of difference between building codes, specifications, state laws, industry standards and the Contract Documents, the most stringent shall govern. Should the ELECTRICAL SUBCONTRACTOR perform any work that does not comply with the requirements of the applicable building codes, state laws, and industry standards, he shall bear all cost arising in correcting these deficiencies.
6. Verify size and ratings of motors and other electrically operated devices supplied by others.
7. Check with ENGINEER before installation of work for outlets not specified as to location or for work that interferes with other trades.

#### 1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protection. Use all means necessary to protect electrical system materials before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements. In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the ENGINEER and at no additional cost to the OWNER. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such special tests as directed by the ENGINEER, at the cost and expense of the ELECTRICAL SUBCONTRACTOR, or shall be replaced by the ELECTRICAL SUBCONTRACTOR at his own expense.
- C. Protect the work of other trades. Restore any damage caused to other trades to the condition existing prior to damage at no additional cost to the OWNER.
- D. Investigate each space in the building through which equipment must pass to reach its final location. If necessary, the manufacturer shall be required to ship his material in sections sized to permit passing through such restricted areas in the building.

#### 1.08 SPECIAL WARRANTY

- A. Compile and assemble the warranties specified in Division 16 into a separate set of vinyl covered three ring binders, tabulated and indexed for easy reference.
- B. Provide complete warranty information for each item. Information to include:
  - 1. Product or equipment list.
  - 2. Date of beginning of warranty or bond.
  - 3. Duration of warranty or bond.
  - 4. Names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

#### 1.09 DEFINITIONS

- A. As used in this specification, “provide” means “furnish and install”, “furnish” means “to purchase and deliver to the project site complete with every necessary appurtenance and support and to store in a secure area in accordance with manufacturers instructions”, and “install” means “to unload at the delivery point at the site or retrieve from storage, move to point of installation and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project”.
- B. Finished Areas. In general, areas with carpet or tile floors, lay-in or fixed ceiling tile, special architectural ceiling treatment, or tiled, plastered, or paneled walls shall be considered finished areas.
- C. Interior. For the purposes of this specification, interior is any area within the boundaries of the foundation of any building within the superstructure or other structures not classified as a building.



- D. Hazardous (Classified) Areas. Hazardous (classified) areas are designated on the drawings in conformance with the Massachusetts Electrical Code (MEC). All equipment and the installation shall conform to requirements for installation in the designated hazardous area as described in Articles 500, 501, and 502 of the MEC.

#### 1.10 TEMPORARY POWER:

- A. The ELECTRICAL SUBCONTRACTOR shall furnish, install, maintain, and remove the temporary electrical power and lighting systems, including lamps, and pay for all labor, materials, and equipment required therefore. All such temporary electrical work shall meet the requirements of the National Electrical Code, the local utility company, and OSHA.
- B. The ELECTRICAL SUBCONTRACTOR shall make all necessary arrangements with the local utility company as to where the temporary electric service can be obtained from.
- C. The ELECTRICAL SUBCONTRACTOR shall secure and pay for all required permits and back charges for work performed by others, and other expenses incidental to the installation of the temporary electric service.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Materials and equipment shall be listed by UL unless it can be demonstrated that no UL standards exist for a specific item or class of equipment.
- B. All other materials, not specifically described but required for a complete and operable electrical installation, shall be new, first quality of their respective kinds, specification grade or better, and as selected by the ELECTRICAL SUBCONTRACTOR subject to the acceptance by the ENGINEER.

### 2.02 INTERCHANGEABILITY

- A. In all design and purchasing, interchangeability of items of equipment, subassemblies, parts, motors, starters, relays and other items is essential. All similar items shall be of the same manufacturer, type, model and dimensions.
- B. For ease of maintenance and parts replacement, to the maximum extent possible, use equipment of a single manufacturer.
- C. The ENGINEER reserves the right to reject any submittal which contains equipment from various manufacturers if suitable materials can be secured from fewer manufacturers and to require that source of materials be unified to the maximum extent possible.

## PART 3 EXECUTION

### 3.01 COORDINATION

- A. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Field verify all locations and dimensions to ensure that the equipment will be properly located, readily accessible, and installed in accordance with all pertinent codes and regulations, the contract documents, and the referenced standards.
- C. The work shall be carefully laid out in advance, and where cutting, drilling, etc., of floors, walls, ceilings, or other surfaces is necessary for the proper installation, this work shall be carefully done, and any damage to building, piping, or equipment shall be repaired by skilled mechanics of the trades involved at no additional cost to the Owner.
- D. In the event any discrepancies are discovered, immediately notify the Owner's Representative in writing. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

### 3.02 INSTALLATION

- A. Install all equipment and fixtures in complete accordance with the manufacturer's recommendations and all pertinent codes and regulations.
- B. Thoroughly inspect all items of equipment and any items dented, scratched, or otherwise damaged in any manner shall be replaced or repaired and painted to match original finish.
  - 1. All items so repaired and refinished shall be brought to the attention of the ENGINEER for inspection and acceptance.
- C. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete or supported from or on other structural components, as they are constructed.
- D. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing in the building and equipment which must be placed in service before further construction can take place.
- E. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
- F. The final routing of raceways shall be determined by structural conditions, interference with other trades and by terminal locations on apparatus. The ENGINEER reserves the right of a reasonable amount of shifting at no extra cost up until time of roughing in the work.

- G. Where circuits are shown as “home-runs” all necessary fittings and boxes shall be provided for a complete raceway installation.
- H. In general, wiring and raceway systems for security alarm, fire alarm, telephone and intercommunications systems are not indicated on the drawings but shall be furnished and installed under this section.
- I. Each lighting and each receptacle circuit shall have its own neutral, dedicated to that circuit. A common neutral for more than one signal phase circuit is not allowed.
- J. Surface mounted panel boxed, junction boxes, conduits, etc., shall be supported by spacers to provide a clearance between wall and equipment.
- K. Upon completion of all installation, lamping, and testing, thoroughly inspect all exposed portions of the electrical installation and completely remove all exposed labels, soils, markings and foreign material.

### 3.03 MARKING AND LABELING

- A. All panelboards, indoor transformers, cabinets, control panels and other specified equipment shall be labeled with engraved laminated plastic plates, minimum 3/4” high with 3/8” engraved letters. Punch tapes with mastic backings are not acceptable.
- B. All starters, disconnect switches and other specified equipment shall be marked with engraved laminated plastic plates, minimum 1/2” high with 1/4” engraved letters. Where individual switches are circuit breakers in power or distribution panelboards do not have cardholders, they shall be marked with 1/2” high labels.
- C. All empty conduits shall have labels tied to the pull string at each end of each empty conduit, marked as to identification of each end. Junction boxes with circuits provided for future use shall be labeled with appropriate circuit designation.
- D. All panelboards directories shall be filled out with typewritten identification of each circuit.

### 3.04 TESTS & SETTINGS

- A. Provide the services of an independent Testing Agency to perform the specified tests for the following systems:
  - 1. Medium voltage cable (where furnished and installed by the ELECTRICAL SUBCONTRACTOR).
  - 2. Pad mounted transformer (where furnished and installed by the ELECTRICAL SUBCONTRACTOR).
  - 3. Switchboard overcurrent device coordination and selectivity with respect to up stream and down stream devices.
  - 4. Harmonic analysis for variable frequency drives.
  - 5. Standby power.
  - 6. Ground resistance.

7. Fire alarm system.
  8. Security alarm system.
- 
- B. The Testing Company shall perform all testing in accordance with National Electrical Testing Association (NETA) standards and procedures. All testing results shall be submitted on NETA forms and the testing data shall be certified by the respective Agency. Test results shall indicate recommended action for a sub-par test results. Results shall list recommended test values that should be obtained for new installation.
  - C. Provide necessary material, equipment, labor and technical supervision to perform and complete the Electrical Acceptance Tests as required.
  - D. Acceptance tests as herein specified are defined as those tests and inspections required to determine that the equipment involved is acceptable as delivered to the job site, that the equipment may be energized for final operational tests and is in accordance with the Specifications.
  - E. Final acceptance of the equipment and/or workmanship will depend upon performance characteristics as determined by the subject tests, in addition to complete operation tests, on all electrical equipment to show that it will perform the functions for which it was designed.
  - F. If the test and inspection data submitted should indicate deficiencies in the operation of the electrical apparatus or in the manufacturer thereof, the ELECTRICAL SUBCONTRACTOR shall promptly implement the necessary adjustments, corrections, modifications and/or replacements necessary to be made to meet the specified requirements.
  - G. Upon completion of the remedial work, the Testing Agency shall repeat all of the tests on components previously found deficient on the first test or any additional test if they be required. It shall be the responsibility and obligation of the Electrical Subcontractor to have all remedial work accomplished as may be required by second and/or additional tests.

### 3.05 CLEANING

- A. General. When all work is completed and has been tested and accepted by the Owner's Representative, the ELECTRICAL SUBCONTRACTOR shall clean all light fixtures, equipment, and exposed surfaces that have been directly affected by this work. The ELECTRICAL SUBCONTRACTOR, insofar as the work is concerned, shall at all times keep the premises in a neat and orderly condition and at the completion of the work shall properly clean up and remove from the site any excess materials.

END OF SECTION

## SECTION 16110

### RACEWAY

#### PART 1 – GENERAL

##### 1.01 SCOPE

- A. The Electrical Subcontractor shall provide the labor, tools, equipment, and materials necessary to install raceways in accordance with the plans and as specified herein.
- B. All raceway systems shall be complete with fittings, boxes, and necessary connections as required.
- C. Types of raceways in this section include the following:
  - 1. Intermediate metal conduit (IMC).
  - 2. Liquid tight flexible conduit.
  - 3. Rigid galvanized steel conduit (RGS).
  - 4. Rigid nonmetallic conduit (PVC).
  - 5. Wireways.
  - 6. Underground ducts.

##### 1.02 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. Related Sections. The following sections contain requirements that relate to this section:
  - 1. Section 16050 Basic Electrical
  - 2. Section 16120 Wires and Cables (for other wiring methods).
  - 3. Section 16130 Cabinets, Boxes and Fittings (for boxes used with conduit and tubing systems).

##### 1.03 QUALITY ASSURANCE

- A. Reference Standards:
  - 1. National Fire Protection Association (NFPA) 70 "Massachusetts Electrical Code" (MEC).
  - 2. National Electrical Manufacturers Association (NEMA) Compliance.
  - 3. Underwriter's Laboratories, Inc. (UL) Compliance and Labeling. Provide raceway products and components listed and labeled by UL, Electrical Testing Laboratories (ETL), or Canadian Standards Association (CSA).

## 1.04 SUBMITTALS

- A. Furnish manufacturer's product data, test reports, and materials certifications as required.
- B. Submit in accordance with Conditions of Contract and Division 1 specification sections:

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Metal Conduit and Tubing
  - 1. Provide rigid steel conduit conforming to ANSI C80.1.
  - 2. Provide intermediate steel conduit conforming to UL 1242.
  - 3. Provide liquid tight flexible metal conduit and fittings conforming to UL 360.
- B. Nonmetallic Conduit
  - 1. Rigid Nonmetallic Conduit. PVC, Schedule 40 or 80, 90° C, conforming to NEMA TC-2, UL 651, and MEC Article 347.
- C. Fittings and Couplings:
  - 1. Threaded for rigid and IMC.
  - 2. Compression for EMT.
  - 3. Solvent weld for PVC, NEMA TC3.
  - 4. Ferrous fittings shall be cadmium or zinc-coated, UL 614B.
  - 5. Fittings for use in hazardous locations, UL 886.
  - 6. Conduit Bodies
  - 7. LB type conduit fitting.
  - 8. Galvanized unistrut with hardware conduit clamp.
- D. Wireways
  - 1. General Purpose Wireways. NEMA 1 steel, front accessible, totally enclosed with bolted covers. Finish with rust-inhibiting coating and gray baked enamel finish.
  - 2. Oiltight Wireways. NEMA 12, oiltight and dusttight steel with hinged gasketed cover, external latches, and flanged gasketed joints. Finished with gray enamel paint inside and outside.
  - 3. Watertight Wireways. NEMA 4X, watertight, corrosion resistant stainless steel with hinged gasketed cover, screw clamps, and flanged gasketed joints.

### 2.02 ACCEPTABLE MANUFACTURERS

- A. Conduit.
  - 1. General Electric.
  - 2. National.
  - 3. Allied Tube and Conduit.
  - 4. Carlon.
  - 5. Electri-Flex Company.

6. Republic.
  7. Perma-Cote Industries.
  8. Robroy Industries, Inc.
  9. Triangle PWC, Inc.
  10. VAW of America, Inc.
  11. Wheatland Tube Co.
- B. Conduit Fittings and Accessories.
1. Pyle-National.
  2. American Electric.
  3. Appleton Electric Co.
  4. Carlon.
  5. Crouse-Hinds Division, Cooper Industries, Inc.
  6. Thomas & Betts.
  7. Killark Electric Mfg. Co.
  8. Kraloy Products Co.
  9. O-Z/Gedney.
  10. Perma-Cote Industries
  11. Raco
  12. Robroy Industries.
  13. Unistrut Corp.
- C. Wireways
1. American Electric
  2. B-Line Systems, Inc.
  3. Circle AW Products.
  4. GS Metals Corp.
  5. Hoffman Engineering Co.
  6. Square D Company.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. Uses Permitted
1. Use liquidtight flexible metal conduit for the final 24 inches of connections to motors or control items subject to movement or vibration.
  2. Use RGS or IMC for all exterior aboveground installations unless otherwise noted.
  3. Use Schedule 40 PVC conduit for exterior direct buried installations.
  4. Use Schedule 40 PVC conduit for exterior concrete encased installations. The transition from concrete encasement to riser shall be rigid steel conduit.
  5. Use RGS or IMC for all other interior installations not exposed to severe moisture or corrosive conditions such as chemical feed area unless otherwise noted.
  6. Use Schedule 40 PVC conduit within chemical feed area only.
  7. Use EMT for lighting circuits above hung ceilings in finished area only.

8. Use RGS for installation in the classified area.

B. Routing

1. Install exposed conduits, parallel or perpendicular to walls, ceilings, or structural members. Do not run through structural members. Avoid horizontal runs within partitions or side walls. Avoid ceiling inserts, lights, or ventilation ducts or outlets. Do not run conduits across pipe shafts or ventilation duct openings and keep conduits a minimum of 6 inches from parallel runs of flues, hot water pipes, or other sources of heat. Wherever possible, install horizontal raceway runs above water and steam piping.
2. Conduits installed in all new construction shall be concealed in walls or slabs. New conduits installed in existing areas shall be concealed where practical.
3. Conduits installed in other interior areas shall not be embedded in waterproofed or water bearing walls. Where possible, conduits to motors or equipment more than 3 feet from walls shall be run in or under the slab and stubbed up to the junction box. For all other interior applications, conduits shall be installed, exposed, or concealed as indicated on the plans.
4. For conduits installed in exterior areas:
  - a) Do not run conduits exposed on the exterior surface of buildings.
5. Conduits penetrating exterior walls below grade, at grade floors, or below grade floors shall be sealed to prevent moisture migration. The exterior of the conduit shall be sealed with a mechanical pipe seal. The interior conduit seal shall be a gland type sealing bushing or RTV closed cell silicone foam. Ensure that conduits do not retain water against these seals.
6. Conduits shall penetrate roofs only where specifically shown on the plans. Provide all required flashing.  
Raceways penetrating fire rated walls, floors, and partitions shall be sealed with a fire rated sealant as described in Division 16 specification Section "Basic Electrical"
7. All conduits must be supported with materials specifically made for this purpose. Do not use wire hangers. Do not attach any parts of the raceway system to ventilation ducts. Conduit supports shall be attached to the building. Support conduits on each side of bends and on a spacing not to exceed the following: 6 feet for conduits smaller than 1 1/4 inches and 8 feet for conduits 1 1/4 inches and larger. Support riser conduits at each floor level with clamp hangers. All underground conduits shall be securely anchored to prevent movement during placement of concrete or backfill. Use precast separators and heavy gauge wire ties or other approved fasteners.
8. Install accessible pull boxes in runs over 100 feet or with more than three 90° bends or equivalent.
9. All empty conduits shall have #14 galvanized steel pull wire and terminate in accessible junction boxes or have accessible capped ends for future use.
10. Use E.Y.S. seal fittings for all conduits leaving hazardous areas and chemical rooms.



C. Conduit Embedded In Slab

1. Electrical conduit may be embedded in concrete according to the provisions of Article 6.3 of ACI 318 "Building Code Requirements for Reinforced Concrete", provided the following conditions are met:
  - a) Outside diameter of conduit shall not exceed 1/3 of concrete thickness. Maximum conduit outside diameter shall not exceed 3 inches when embedded in slab.
  - b) Conduit shall not be placed closer than three diameters on center. Route conduit to minimize crossing of different conduit runs.
  - c) Conduit shall not be embedded in structural concrete slabs less than four inches thick.
  - d) A 1 1/2 inch minimum concrete cover shall be provided for conduits in structural concrete slabs.
  - e) Conduit shall be located between the bottom and top of reinforcing steel. Conduit, crossing in the slab must be reviewed by the ENGINEER for proper cover.
  - f) Conduit is generally not permitted in beams or girders.
  - g) Only two conduits may cross at any point. The sum of the outside diameters of the crossing conduits shall not exceed 1/3 of the concrete thickness.
  - h) Provide additional reinforcement around all groups of conduits which stub up through the slabs.
  - i) Except where there are only isolated runs of conduit in slab, a plan showing conduit detail and the proposed routing of the conduits in slab shall be submitted, for the ENGINEERS approval prior to installation.

D. Underground Conduits

1. When installed in concrete or underground, apply two coats of approved asphalt paint to metallic conduits. Provide protection for conduit in areas subject to vehicle traffic.
2. Where conduits are installed in concrete slabs, on the ground, underground, or exposed to the weather, make all joints liquid tight and gas tight.
3. Bury all underground conduit, except under concrete slabs placed on fill, to a depth of at least two feet below finished grade unless otherwise indicated on the Drawings.
4. Slope ducts to drain away from buildings into manholes and/or handholes. Adjust final slopes to coordinate with existing site utilities.
5. Install on undisturbed soil where possible. Concrete encase conduits as shown on Drawings. Use pit run gravel and sand, placed 8 in. lifts and compacted for backfill.
6. After installation, clean and swab ducts.
7. Install galvanized steel pull wires in spare ducts. Cap spare ducts.

END OF SECTION

## SECTION 16120

### WIRE AND CABLES

#### PART 1 GENERAL

##### 1.01 SCOPE

- A. The Electrical Subcontractor shall provide the labor, tools, equipment, and materials necessary to install wires, cables, and connectors in accordance with the plans and as specified herein.
- B. This section includes wires, cables, and connectors for power, lighting, signal, control, and related systems rated 600 volts and less.

##### 1.02 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. Related Sections:
  - 1. Section 16050 Basic Electrical

##### 1.03 QUALITY ASSURANCE

- A. Reference Standards:
  - 1. National Fire Protection Association (NFPA) 70 "National Electrical Code (NEC)."
  - 2. Underwriter's Laboratories, Inc. (UL) Compliance.
    - a) UL Standard 83 Thermoplastic Insulated Wires and Cables.
    - b) UL Standard 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors.
    - c) UL Standard 854 Service Entrance Cable.
  - 3. National Electrical Manufacturers Association (NEMA) Compliance.
    - a) WC-5 Thermoplastic Insulated Wire and Cable for the
    - b) WC-7 Cross Linked Thermosetting Polyethylene Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
    - c) WC-8 Ethylene Propylene Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
  - 4. Institute of Electrical and Electronic Engineers (IEEE) Compliance.
    - a) Standard 82 Test Procedure for Impulse Voltage Tests on Insulated Conductors.

##### 1.04 SUBMITTALS

- A. Furnish manufacturer's product data, test reports, and materials certifications as required.

- B. Submit the following in accordance with Conditions of Contract and Division 1 specification sections:
  - 1. Product data for electrical wires, cables, and connectors.
  - 2. Product data for Megger insulation testing instrument.
  - 3. Report sheets for Megger testing.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wire and cable properly packaged in factory fabricated type containers, or wound on NEMA specified type wire and cable reels.
- B. Store wire and cable in clean dry space in original containers. Protect products from weather, damaging fumes, construction debris, and traffic.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. General
  - 1. Provide factory fabricated wires of sizes, ampacity ratings, and materials for applications and services indicated. Where not indicated, provide proper wire selection as determined by Installer to comply with project's installation requirements, NEC and NEMA standards. Select from the following UL types those wires with construction features which fulfill project requirements:
  - 2. Provide color coding for phase identification in accordance with requirements in Division 16 section "Electrical Identification."
  - 3. Provide factory applied nylon or polyvinyl chloride (PVC) external jackets on wires and cables for pulls in raceways over 100 feet in length, for pulls in raceways with more than three equivalent 90 degree bends, for pulls in conduits underground or under slabs on grade, and where indicated.
- B. Service Wiring:
  - 1. 98 percent conductivity copper.
  - 2. 600 volt insulation, type RHW-RHH.
  - 3. U.L. listed for underground use in wet locations at 75° C.
- C. Building Wiring:
  - 1. 98 percent conductivity copper.
  - 2. 600 volt insulation, type THWN-THHN.
  - 3. Solid conductor: #10 AWG and smaller.
  - 4. Stranded conductor: #8 AWG and larger.
  - 5. Minimum branch circuit: #12 AWG.
  - 6. Minimum control wiring: #14 AWG, unless otherwise indicated.

- D. Instrumentation
1. Instrumentation wiring for remote monitoring of equipment shall be #14 AWG, copper stranded.
  2. Instrumentation wiring for transmitting 4-20mA DC signals shall be shielded, 2-conductor, minimum #18 AWG, equal to Belden No. 8179.
- E. Splices:
1. No. 10 and smaller with 600 volt pressure type insulated connector of wire-nut type, or equal; soldered and crimped type not allowed. Ideal type "wire nut" Buchanan type "B-Cap" and Minnesota Mining (3M) type "Scotchlok".
  2. No. 8 and larger with solderless lugs or solderless connectors of Lock-tite or similar type properly taped with plastic insulating tape, Minnesota Mining Co. #33, or equal, then two half-lap servings of friction tape, Manson, or equal.
  3. Wire connector systems for use with underground conductors shall be UL listed specifically for such use.
  4. Service entrance conductors shall be installed without splices. Electrical equipment feeders shall be spliced only where shown or specifically approved. Control and metering conductors shall be installed without splices.
  5. All splices shall be made only by specific permission of the Engineer and then only in manholes or pull boxes and shall be sealed watertight with a heat shrunk insulation.
  6. Tighten electrical connectors and terminals in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and 486B.
  7. Use UL listed splice for all underground wires, ducts buried, in conduit and in ducts. Connectors and splices shall be waterproof.

## 2.02 ACCEPTABLE MANUFACTURERS

- A. Wire and Cable.
1. American Insulated Wire Corp.
  2. Brintec Corp.
  3. Carol Cable Co., Inc.
  4. Pirell.
  5. General Cable.
  6. Rome.
  7. Triangle.
- B. Connectors and Terminals for Wires and Cable Conductors.
1. AMP.
  2. Burndy Corporation.
  3. Ideal Industries, Inc.
  4. 3M Company
  5. O-Z/Gedney Co.
  6. Raychem.
  7. Thomas and Betts Corp.

PART 3 EXECUTION

3.01 WIRE AND CABLE INSTALLATION

- A. All wire and cables shall be installed in conduit of size and type indicated on the drawing and specifications.
- B. Install electrical cables, wires, and connectors in compliance with NEC.
- C. Coordinate cable installation with other work.
- D. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant, where necessary.
- E. Use pulling means including, fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Do not use rope hitches for pulling attachment to wire or cable.
- F. Conceal all cable in finished spaces.
- G. Install exposed cable parallel and perpendicular to surfaces or exposed structural members, and follow surface contours, where possible.
- H. Power conductors shall be No. 12 AWG minimum. Control conductors may be No. 14 AWG where circuit amperes and the NEC allow and when length does not pose a voltage drop problem.
- I. Conductors shall be sized such that voltage drop does not exceed 3 percent for branch circuits or 5 percent for feeder/branch circuit combination.
- J. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than No. 10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.
- K. All feeder and branch circuit wiring shall be color coded at all termination and splice locations. System neutrals shall be designated in addition to phase conductors. Equipment grounds shall be green.
- L. The number of conductors shown on the Drawings is not necessarily the correct number required. As many conductors as are required in each case shall be installed. Grounding conductors are not scheduled.

### 3.02 FIELD QUALITY CONTROL

- A. The Electrical Subcontractor shall test each electrical circuit after permanent cables are in place with terminators installed, but before cable or wire is connected to equipment or devices to demonstrate that each circuit is free from improper grounds and short circuits.
- B. The Electrical Subcontractor shall test by Megger Test, the insulation resistance between phases and from each phase to ground for each of the following feeder and motor branch circuits:
  - 1. Panelboards.
  - 2. Motors.
  - 3. Motor Control Centers.
- C. The Megger Testing shall be witnessed by the Engineer/Architect. The Engineer/Architect shall be notified at least 48 hours in advance of testing.
- D. Measure the insulation resistance at 500 volts dc with a hand cranked or motor driven "Megger" insulation testing instrument. Battery operated test instruments are not permitted. All test instruments are to be provided by the Electrical Subcontractor.
- E. If any insulation resistance measures less than 50 megohms, the cable shall be considered faulty with the cable failing the insulation test. In moist environments, bag the ends of the cable to prevent a faulty Megger test.
- F. Any cable which fails the insulation tests or which fails when tested under full load conditions shall be replaced with new cable for the full length and retested at no additional cost to Owner.
- G. The below grade service or feeder splice shall be water immersion Megger tested in the presence of the Engineer. Each splice shall be immersed in a grounded water immersion bath for 24 continuous hours prior to and during the test. Criteria for failure shall be as described for cable above.

END OF SECTION

## SECTION 16130

### CABINETS, BOXES AND FITTINGS

#### PART 1 GENERAL

##### 1.01 SCOPE

- A. The Electrical Subcontractor shall provide the labor, tools, equipment, and materials necessary to furnish and install cabinets, boxes, and fittings in accordance with the plans and as specified herein.
- B. This section includes cabinets, boxes, and fittings for electrical installations and certain types of electrical fittings not covered in other sections. Types of products specified in this section include:
  - 1. Outlet and device boxes.
  - 2. Pull and junction boxes.
  - 3. Boxes and fittings for hazardous locations.
  - 4. Hinged door enclosures.

##### 1.02 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. Related Sections:
  - 1. Section 16050 Basic Electrical
  - 2. Section 16110 Raceways

##### 1.03 QUALITY ASSURANCE

- A. Reference Standards.
  - 1. Underwriter's Laboratories, Inc. (UL) Listing and Labeling. Items provided under this section shall be listed and labeled by UL.
  - 2. Massachusetts Electrical Code (MEC) Compliance.
  - 3. National Electrical Manufacturers Association (NEMA) Compliance.

##### 1.04 SUBMITTALS

- A. Furnish manufacturer's product data, test reports, and material certifications as required.
- B. Submit the following in accordance with Conditions of Contract and Division 1 specification sections:
  - 1. Product data for cabinets and enclosures with classification higher than NEMA 1.
  - 2. Shop drawings for floor boxes and boxes, enclosures and cabinets that are to be shop fabricated (nonstock items).

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Cabinets, Boxes, and Fittings, General
1. Electrical cabinets, boxes, and fittings of indicated types, sizes, and NEMA enclosure classes. Where not indicated, provide units of types, sizes, and classes appropriate for the use and location. Provide all items complete with covers and accessories required for the intended use. Provide gaskets for units in damp or wet locations and provide air sealing gaskets for units mounted in exterior walls.
- B. Materials and Finishes
1. Provide fasteners for general use which are corrosion resistant screws and hardware including cadmium and zinc plated items.
  2. Provide fasteners for damp or wet locations which are stainless steel screws and hardware.
  3. Provide cast metal for boxes, enclosures, and covers which are copper-free aluminum except as otherwise specified.
  4. Provide exterior finish which is gray baked enamel for items exposed in finished locations except as otherwise indicated.
  5. Provide fittings for boxes, cabinets, and enclosures which conform to UL 514B. Malleable iron or zinc plated steel for conduit hubs, bushings, and box connectors.
- C. Metal Outlet Boxes
1. Conform to UL 514A, "Metallic Outlet Boxes," and UL 514B, "Fittings for Conduit and Outlet Boxes." Boxes shall be of type, shape, size, and depth to suit each location and application.
  2. Provide cast iron boxes of iron alloy, waterproof, with threaded raceway entries and features and accessories suitable for each location, including mounting ears, threaded screw holes for devices and closure plugs.
- D. Pull and Junction Boxes
1. Comply with UL 50, "Electrical Cabinets and Boxes", for boxes over 100 cubic inches volume. Boxes shall have screwed or bolted on covers of material same as box and shall be of size and shape to suit application cover shall be gasketed.
  2. Provide hot-dipped galvanized steel boxes constructed of sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanized after fabrication. Cover shall be gasketed.
- E. Nonmetallic Outlet, Device, and Wiring Boxes
1. Conform to NEMA OS 2, "Nonmetallic Outlet Boxes, Device Boxes, Covers, and box Supports," and UL 514C, "Nonmetallic Outlet Boxes, Flush Device Boxes and Covers." Boxes shall be molded polyvinyl chloride (PVC) units of type, shape, size, and depth to suit location and application.



2. Boxes shall be equipped with threaded screw holes for device and cover plate mounting. Each box shall have a molded cover of matching PVC material suitable for the application.

F. Precast Concrete Handholes

1. Concrete Strength: Minimum, 4,500 psi compressive, in 28 days.
2. Loading: AASHTO, H-20 in accordance with ASTM C857.
3. Drainage:
  - a. Slope floors towards drain points, leaving no pockets or other nondraining areas.
  - b. Provide 6-inch drainage outlet at low point of floor with grate and 10 cubic feet of 1-inch to 1-1/2-inch gravel, all around sump.
4. Raceway Entrances:
  - a. Provide on two opposite sides.
  - b. Provide knockout panels or precast individual raceway openings.
5. Cable Racks:
  - a. Arms and Insulators: Adjustable, of sufficient number to accommodate cables for each raceway entering or leaving handhole, including spares.
6. Handhole Frames and Covers:
  - a. Material: Steel, hot-dipped galvanized.
  - b. Cover Type: Solid, hinged, torsion spring, of checkered design.
  - c. Cover Loading: AASHTO H-20.
  - d. Cover Designation: Inscribe "ELECTRIC" in cover.
7. Hardware: Steel, hot-dipped galvanized.
8. Furnish knockout for ground rod in each handhole.

2.02 ACCEPTABLE MANUFACTURERS

- A. American Electric
- B. Appleton
- C. Associated Concrete Products, Inc.
- D. Carlon
- E. Chase Precast Corp.
- F. Concrete Conduit Co.
- G. Crouse Hinds
- H. Hoffman Engineering Co.
- I. Killark Electric Mfg. Co.
- J. O.Z. Gedney
- K. Penn-Cast Products, Inc.
- L. Parker Electrical Mfg. Co.
- M. Pipe, Inc.
- N. Raco/Bell Division Harvey Hubbell
- O. Spring City Electrical Mfg. Co.
- P. Square D Co.
- Q. Steel City/Thomas & Betts
- R. Utility Vault Co.

PART 3 EXECUTION

3.01 INSTALLATION

A. General

1. Install items where indicated and where required to suit code requirements and installation conditions.
2. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs.
3. Support and fasten items securely in accordance with Division 16 section "Supporting Devices." Boxes shall be securely mounted to the building structure, independent of the raceway entering or leaving.
4. Sizes shall be adequate to meet MEC volume requirements, but in no case smaller than sizes indicated.
5. Remove sharp edges where they may come in contact with wiring or personnel.

B. Uses Permitted

1. Outlet Boxes.
  - a. Use nonmetallic boxes in corrosive areas such as chemical feed and storage or as designated on the plans.
  - b. Use explosionproof boxes in hazardous areas as designated on the plans.
  - c. Use cast metal boxes in all other locations. Each box with associated covers and fittings shall have a NEMA rating suitable for each location installed.
2. Pull and Junction Boxes.
  - a. Use general purpose boxes (NEMA 1) in finished areas with framed construction.
  - b. Use dusttight and oiltight boxes (NEMA 12) in other dry interior areas.
  - c. Use explosionproof boxes (NEMA 7) in hazardous areas as designated on the plans.
  - d. Use watertight boxes (NEMA 4) for exterior and wet locations on outdoor structure where moisture is present.
3. Cabinets
  - a. Install enclosures and associated materials and NEMA types suitable for each location and in conformance with the drawings.

C. Installation of Outlet Boxes

1. Surface mount outlet boxes for exposed conduit runs.  
Adjust position of outlets in finished masonry walls to suit masonry course lines.
2. Coordinate cutting of masonry walls to achieve neat openings for boxes.
3. Use rotary cutting equipment to cut masonry work for installation of electrical fittings.
4. Locate boxes in masonry walls so that only a corner need be cut from masonry units.
5. Do not use sectional or handy boxes unless specifically requested.

6. Adjust outlet mounting height to agree with required location for equipment served.
7. Wall boxes in block construction shall be masonry boxes with inside ears and shall be concrete tight.
8. Outlet boxes shall be installed at all lighting fixtures.
9. Mount outlet boxes for switches with the long axis vertical or as indicated. Mount boxes for receptacles either vertically or horizontally, but consistently either way. Locate boxes for switches near doors on the side opposite the hinges and close to door trim, even though electrical floor plans may show them on hinge side.
10. For concrete boxes use extra deep boxes to permit side conduit entrance without interfacing with reinforcing, but do not use such boxes with over 6 inch depth.
11. For existing outlet boxes where extension rings are required to be installed, drill new mounting holes in the rings to align with the mounting holes on the existing boxes where existing holes are not aligned.

D. Installation of Pull and Junction Boxes

1. For boxes in main feeder conduit runs, use sizes not smaller than 8 inches square by 4 inches deep. Do not exceed 6 entering and 6 leaving raceways in a single box. Quantities of conductors (including equipment grounding conductors) in pull or junction box shall not exceed those required by MEC.
2. Install clamps, grips, or devices to which cables may be secured. Arrange cables so they may be readily identified. Support cable at least every 30 inches inside boxes.
3. Mount pull boxes in inaccessible ceilings with the covers flush with the finished ceiling.
4. Provide pull and junction boxes for telephone, signal, and other systems at least 50 percent larger than would be required by Article 370 of MEC, or as indicated.
5. Steel enclosed wireways and auxiliary gutter may be used at grouped equipment locations and at other locations where multiple circuits are run, when such use is accepted by the ENGINEER.

E. Installation of Handholes

1. Excavate, shore, backfill, and final grade in accordance with Section 02222, Earthwork.
2. Do not install until final raceway grading has been determined.
3. Install such that raceway enters at nearly right angle and as near as possible to end of wall, unless otherwise shown.

### 3.02 GROUNDING

- A. Electrically ground metallic cabinets, boxes, and enclosures.

END OF SECTION

## SECTION 16450

### GROUNDING

#### PART 1 GENERAL

##### 1.01 SCOPE

- A. The Electrical Subcontractor shall provide the labor, tools, equipment, and materials necessary to furnish and install grounding materials in accordance with the plans and as specified herein.
- B. Grounding. This section includes solid grounding of electrical systems and equipment.

##### 1.02 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. Related Sections
  - 1. Section 16050 Basic Electrical
  - 2. Section 16120 Wires and Cables

##### 1.03 QUALITY ASSURANCE

- A. Reference Standards.
  - 1. "Massachusetts Electrical Code" (MEC), as applicable to electrical grounding and bonding, Art. 250. Use of conduit system for ground conductor shall not be allowed.
  - 2. Underwriters' Laboratories, Inc. (UL). UL 467 "Electrical Grounding and Bonding Equipment."
  - 3. Institute of Electrical and Electronic Engineers (IEEE) IEEE 81 and 142.
    - a) 80-1986, "IEEE Guide for Safety in AC Substation Grounding."
    - b) 81-1983, "IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounded System (Part 1)."
    - c) 141-1993, "IEEE Recommended Practice for Electric Power Distribution for Industrial Plants."
    - d) 142-1991, "IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems."

##### 1.04 SUBMITTALS

- A. Submit the following in accordance with Conditions of Contract and Division 1 specification sections:
  - 1. Product data for each type of product specified.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Provide each electrical grounding system with assembly of materials required for complete installation including wires/cables, connectors, lugs, clamps, ground rods, bonding jumpers and accessories.
- B. Provide electrical grounding conductors for grounding connections matched to power supply wiring materials and sized according to N.E.C.
- C. Provide electrical connectors, lugs, clamps, bonding jumpers and accessories as recommended by the respective manufacturer for the particular application, unless other indicated.
- D. Ground rods; Solid copper, 5/8-inch diameter by 10 feet long.
- E. Insulated conductors: Green in color.
- F. Ground Bus. Bare annealed copper bars of rectangular cross section, 1/4" x 3" x length as required, with 98 percent conductivity, rigidly attached to structure.
- G. Bonding Strap Conductor/Connectors. Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.
- H. Pressure Connectors. High conductivity plated units.
- I. Bolted Clamps. Heavy duty units listed for the application.
- J. Exothermic Welded Connections. Provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

### 2.02 ACCEPTABLE MANUFACTURERS

- A. Burndy Corporation.
- B. A.B. Chance Co.
- C. Dossert Corp.
- D. Erico Products, Inc.
- E. GB Electrical, Inc.
- F. Joslyn Manufacturing Co.
- G. Kearney-National.
- H. O-Z/Gedney Co.
- I. Quazite Corporation.
- J. Racco, Inc.
- K. Thomas and Betts.

PART 3 EXECUTION

3.01 GROUNDING AND BONDING

- A. Ground main service entrance distribution panel ground bus or lug to neutral of incoming service, to enclosure, to building steel and to main cold water pipe. Install grounding bushings or service conduits.
- B. Provide equipment grounding conductors in all conduits containing power, control, or instrumentation conductors on the load side of the service equipment or on the load side of a separately derived system.
- C. Comply with MEC Article 250 for sizes and quantities of equipment grounding conductors, except that larger sizes indicated or shown on the Contract Documents shall take precedence. Use of metallic conduit systems for equipment grounding as recognized by the MEC shall not be permitted under this specification.
- D. Separately derived systems required by MEC to be grounded shall be grounded in accordance with MEC 250-26.
- E. In addition, bond the grounded conductor of the separately derived system to the nearest available point on the interior metal water piping system, per MEC 250-80(a), or if no water piping extend to main service disconnect ground.
- F. Install grounding bushings on conduits at both primary and secondary entrances to transformers. Ground transformer enclosures to bushings.
- G. Install bonding jumper for flexible metal conduit unless fittings are approved for grounding or otherwise comply with N.E.C.
  - 1. Size jumper to match over-current device.
  - 2. Green insulation.
  - 3. Connect to grounding bushing at each end.
- H. Ground each metal lighting pole or standard with a common bare copper equipment grounding conductor run with the circuit conductors.
- I. Ensure that entire electrical system is electrically continuous and permanently and effectively grounded, including all electrical equipment and motors.
- J. Locate ground rods with a minimum of one rod length from each other and at least the same distance from any other grounding electrode. Connect ground conductors to ground rods by means of exothermic welds except at test wells and as otherwise indicated. Drive rods until tops are 24 inches below finished floor or final grade except as otherwise indicated.
- K. Route grounding electrode conductors along the shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.

- L. Ensure that grounding electrode conductor connections to interior piping, structural members, and the like are accessible for periodic inspection during the life of the structure.

### 3.02 BONDING FOR OTHER TRADES

- A. Signal raceways, water piping, heating piping and metallic air ducts shall be bonded together and to the grounding conductor with No. 8 soft drawn bare solid conductors. Connections to pipes shall be made with cast clamps of like material as the pipes to which attached, to ducting terminated in a secure manner by best practical means, bonding across any flexible or insulated connections.
- B. All bonding conductors shall be installed in a neat and workmanlike manner, properly shaped for contour of surface involved and properly supported. At locations remote from the switch gear, bond to the largest raceway nearby.

### 3.03 FIELD QUALITY CONTROL

- A. Independent Testing Organization. Arrange and pay for the services of a qualified independent electrical testing organization to perform tests described below.
- B. Measure ground resistance without the soil being moistened by any means other than natural precipitation or natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the three point fall of potential method in accordance with Section 9.03 of IEEE 81. Simple moisture addition is not acceptable.
- C. Ground/resistance maximum values shall be as follows:
  - Equipment rated 500 kVA and less. 10 ohms.
  - Equipment rated 500 kVA to 1000 kVA. 5 ohms.
  - Equipment rated over 1000 kVA. 3 ohms.
  - Unfenced substations and pad mounted equipment. 5 ohms.
  - Fence Grounds. 10 ohms.
- D. Where ground resistances exceed specified values, and if directed, modify the grounding system to reduce resistance values. Where measures are directed that exceed those indicated under the provisions of the Contract, covering change orders will be provided.

END OF SECTION